

THE
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of the

FIELD NATURALISTS CLUB OF VICTORIA

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Hon. Editor : Ina M. Watson

The Author of each Article is responsible for
the facts and opinions recorded

MELBOURNE:

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1952

WHAT, WHERE AND WHEN

General Excursions:

Sunday, January 27—Kallista, Sherbrooke Forest. Subject: General Natural History. Leader: Mrs. M. Pinches. Book 2nd return Upper Ferntree Gully, 8.48 a.m. train, take bus to Ferny Creek, alight Mechanics' Institute. Lunch at the Falls, then to Belgrave via the back road. A six-mile walk.

Saturday, February 2—Geelong Botanic Gardens. Subjects: Scarlet Flowering Gums and Marine Life. Leaders: Marine Biology Group and Mr. K. Atkins. 9.35 a.m. train Spencer Street. Hot water, etc., available at Geelong beach.

Saturday, February 16—Motor Coach Excursion to Cape Schank, via Dromana, Boneo Road, return through Red Hill. Coach leaves Batman Avenue 8.15 a.m. Subjects: Geology and Botany. Leaders to be announced. Reserved seat bookings, 18/-, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale (Tel. FU 1096). Four seats at half-fare allotted to junior members.

Group Fixtures:

Tuesday, January 15—Native Plants' Preservation Group. At home of Miss W. Waddell, 3 Denham Place, Toorak, at 8 p.m.

Tuesday, February 5—Geology Group, Royal Society's Hall, at 8 p.m. Subject: "Geological Reminiscences of the Holidays", by members.

Thursday, February 7—Wildflower Garden Group, Royal Society's Hall, at 8 p.m.

Friday, February 8—Marine Biology Group, Royal Society's Hall, at 8 p.m.

Saturday, February 9—Geology Group, Excursion, details at monthly meeting.

KENNETH ATKINS,
Excursions Secretary.

GEOLOGICAL SURVEY OF VICTORIA

(Review)

Many of our readers may be interested to know that Memoir No. 17, The Mornington Peninsula, has just been issued by the Mines Department of Victoria.

In the foreword Dr. D. E. Thomas, Chief Government Geologist, says: "This work was commenced in 1921 but was left incomplete when the author was transferred in 1927 to investigate the possibility of oil occurrences in western Victoria. Shortly afterwards Mr. Keble was appointed palaeontologist of the National Museum, but less than two years before his retirement he was transferred to the Mines Department in order that he could complete this work.

"This Memoir gives a picture of the geological structure of the Peninsula, the sequence of the Lower Palaeozoic rocks, their faulting and their uplift into blocks in Tertiary times. The economic potentialities—for example, gold, limestone, clays, bauxites, lignites, building stones, and underground water, have also been investigated.

"The Mornington Peninsula is one of the key areas in Australia for the sequence of events in Tertiary times and the juxtaposition of marine, terrestrial, and volcanic rocks has enabled this to be deciphered in its broad outlines. The Peninsula is one of the recreation grounds for the citizens of Melbourne, and this Memoir will be of educational and economic value not only to the tourist and the student, but also to the scientist, economist and agriculturist."

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MAY 10, 1951

No. 809

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, April 9, 1951. The President, Mr. E. E. Lord, was in the chair and about 200 members and friends attended.

The President welcomed visitors to the Club, among whom were Mr. G. C. Singleton, of Sydney, and Mr. Cashin, of the Hobart Museum, who has joined the staff of the Melbourne Museum for three months.

The President also welcomed the new Honorary Secretary of the Club, Mr. F. Lewis, and the Assistant Honorary Secretary, Miss N. Morton, both taking up their duties this evening.

Nomination for membership: Miss Wilhemina L. Dunstan, 49 Aileen Avenue, Caulfield, S.E.8 (L. B. Williams/E. C. Cameron).

The speaker of the evening was Mr. Roy P. Cooper, who recently arrived from Sydney to take up his residence in Melbourne. Mr. Cooper, a leading Australian ornithologist and photographer of bird life, recounted many interesting experiences when photographing his subject, and vividly described a great diversity of birds from the rain forest country of the tropics through southern districts to Central Australia, where hundreds of birds are to be found even in the hottest and driest season of the year.

Mr. Cooper's descriptions were accompanied by splendid slides depicting birds in their natural habitat and illustrating their inherited ability to protect themselves by camouflage.

Members' interest and appreciation were apparent by the hearty applause that followed the lecture.

A vote of thanks was moved by Mr. A. S. Chalk and seconded by Miss I. Watson.

EXHIBITS

WATER COLOUR DRAWINGS OF ORCHIDS. An exhibit of special interest was the large series of paintings by Mr. H. Haase of some seventy-three species of orchids collected from country surrounding Melbourne.

ARTEFACTS found in an aboriginal quarry on South Molle Island, Queensland, and others from Triabunna, Tasmania—Miss C. M. Walker.

STONE AXE-HEAD from an old aboriginal camp on bank of Leichardt River, Kamilaroi, Queensland—Mr. H. Stewart.

FOSSIL CRINOID from Kinglake West—Geology Group.

VIOLET SEA-SNAIL SHELLS collected near Ocean Grove, Victoria—Miss M. Elder.

BIRDS' NESTS, including Eastern Shrike-Tit, Mistletoe Bird and Pink Robin—Miss M. Wigan.

GARDEN-GROWN NATIVE FLOWERS, *Calytrix Fraseri*, from West Australia, *Astroloma canostephioides*—Mr. J. Seaton; *Euc. leucosylon*, var. *rosea*, *Banksia ericifolia*, *Flakea laurina*—Mr. L. Hammett. From Botanic Gardens, *Geijera salicifolia*, *Leptospermum scoparium*, var. *grandiflorum* roseum, *Eriostemon gracilis*, *Medicoma Cunninghamii*—Mr. K. Atkins.

BOWER-BIRDS IN A LONDON ZOO

If you enter the south gate of Regents Park Zoo, London, and turn left you arrive in front of a fairly long series of cages containing, among a variety of birds, what must be the most enterprising avian inhabitants of the Zoo—the Satin Bower-birds.

At my first visit (August 4, 1949) I saw several Bower-birds in female or immature plumage, but they were so active, flying in and out of the room at the back, that it was difficult to be sure of the number. They were part of a cosmopolitan crowd—Chinese Blue Magpies, American Cowbirds, Cardinals, Pagoda Starlings, and others—yet they seemed quite capable of looking after themselves among these strangers.

A notice on the cage stated their acquisition as recently as April 23, 1949, and they had certainly settled down well. Some wise man had put a bundle of dry twigs in with them, and one cheerful blue-eyed bird was busy with a bower at one corner. There were two walls of twigs standing on the sandy floor, and the bird was playing there, chattering away to himself—now adding a feather to this side, surveying it, then taking it to the other side. Other species in the big cage paid no attention to the bower-building, but a Peacock Pheasant which had been scraping near the end of the bower decided to lie down there, almost blocking that entrance. The Bower-bird could not tolerate such behaviour. He worried until, after snapping at him, the pheasant moved to a more peaceful spot. When I left, the bird was as happily occupied with its bower as when I had arrived.

I paid a last visit to the Zoo in colder weather on November 7th, 1949, and found the Bower-birds still active but less noisy. Cages were being repaired, and the bower was down, but material enough for two bowers lay on the floor.

The Zoological Society has a goodly number of Australian birds at Regents Park, including some which have lived there since 1924. I noted about forty species, many of them parrots and cockatoos. Silver Gulls have bred in the Great Aviary. Sometimes the awkward or antiquated names on cages make an Australian gape: "White-backed Piping Crow," "Rosella Parrakeet," etc.

However, among all captive birds in the Zoo, the Satin Bower-birds alone had planned and built a play-house in which to while away the hours. Club members travelling abroad should certainly add these Regents Park birds to their visiting list.

J. LAURIE PROVAS.

"SCIENCE AND THE ADVENTURE OF LIVING"

(By Sir Lawrence Bragg, O.B.E., F.R.S.)

Are machines running away with us? Are we confusing science with technology? These and other questions are discussed by Sir Lawrence Bragg in the Radford Mather Lecture which he delivered before the 1950 meeting of the British Association for the Advancement of Science.

There is much to interest both the amateur and the professional scientist in this lecture, which is reprinted in *The Advancement of Science*, vol. VII, December 27, 1950, pp. 277-284. A copy is available in the F.N.C.V. Library.

—M.M.C.

THE DAWN AND GROWTH OF PLANT LIFE IN AUSTRALIA

By S. F. COLLIVER, Brisbane

The earth as it formed and cooled gave rise to vast clouds of steam which must have formed a canopy around it; this steam, condensing, fell as rain on the hot surface of the earth and was again turned to steam. So it went on until the earth had cooled sufficiently to allow the water to collect as oceans in the hollows. These oceans were still hot and may even have been of fresh water, for it seems possible that the salts of the sea, as we know them today, were brought down from the land by the vast river systems that would appear soon after dry land came into being. However, this part of the story is a long way in the future.

As the waters cooled and the various chemicals came into being, the great chemical laboratory, which was the earth, produced some combination which differed from all the others because it had within it that vital force which we call life. Just what this first form of life was like we cannot know, but we believe the earliest forms belonged to one section of the great plant world.

Of course, the first forms must have been single types, and probably were not even remotely like anything living at the present time, and, as no records are preserved in the earliest rocks, we have no knowledge of these primitive forms.

The later plants that have left records in the slightly younger rocks are forms that we know as algae. Some of these which had the power of secreting limy matter, like the modern form *Halimeda*, have left behind vast masses of limestone built almost entirely of their remains, and these forms lived in the Cambrian age some 500 millions of years ago.

With the earth growing colder and dry land appearing, the natural process of weathering and soil formation started. This soil, as formed, would be moved by the rain, and much would find its way into the river systems and be carried down to the sea. Some of this would be deposited at the river mouths and along the beaches and thus we had an environment coming into being that allowed the evolution of different kinds of plants.

Gradually, and by means still unknown to us, these algal forms gave rise to plants that had roots, or means whereby they were held fixed at one end in these muddy banks.

Some years ago, a discovery of great importance was made in Victoria on the Matlock-McVeigh's Road during repairs. A small quarry produced a large number of fossil plants of this type and their age was fixed by the discovery of marine fossils called *Monograptus* often on the same slab as the plants. This was about 350 million years ago.

These plants, known as *Baragwanathia longifolia*, had the stem

covered, in part at least, with long narrow leaves, and, towards the top, the spore-bearing organs were borne between the leaves and the stem. By means of a special process scientists have been able to isolate bodies thought to be fossil spores, and thus we have considerable knowledge of this early plant form and place it as belonging to a primitive section of the Club Mosses or *Lycopods*.

Millions of years later these lycopods formed extensive forests in the swampy places that extended over large areas of the earth.

Of course, there were other more primitive plants existing as well, but we are not able to consider many of these forms in a short chapter.

About 300 million years ago the forests consisted of this class of plant and we know of fossil forms up to forty feet long; the forests of those days were not as tall as those of the present time.

Other types of plants resembling grass trees, and early fern-like forms made up the forest floor and extended to the drier areas around the swamps. Today we find fossil remains of these lycopods in Gippsland, Victoria, in parts of New South Wales and around Gilberton in Queensland, so we know there were a number of swampy forests along the eastern part of Australia.

The swamps dried up and the forests gradually changed in character, certain parts were over-run by incursions of the sea and marine life; fresh water swamps and dry land conditions came and went with continued change in the plant life. About this time two forms of possible ferns came into being—one with, and one without a midrib. Both broad-leaved forms, the first mentioned is known as *Glossopteris* and the second as *Gangamopteris*.

These very common fossil forms are found in Australia, India, South Africa and South America, in rocks of Permo-Carboniferous age, perhaps 200-250 millions of years old, and are one of the pieces of evidence used by some to suggest that a vast land mass, known as Gondwana Land, once existed over this whole area and that the continents, as mentioned, are just remnants of this.

At this time in Australian prehistory the forest roof must have been quite low and the forest itself without much variety of plant form. Perhaps the spread of the forest compensated, as we have fossil evidence of these types of plants ranging from Tasmania through Victoria, New South Wales and into southern Queensland.

Our forests and plant communities so far have been of great mosses, ferns and fern-like plants, with a few oddments rather indefinite as to type, all, however, very different from those of the present day. The time has now arrived in the history of the earth to show production of more modern forms, and in the Triassic age, possibly 130 million years ago, conifer wood first became common, as did trees closely allied to the *Gingko biloba*, or Japanese Maiden-hair tree, often the pride of parks and gardens.

Around Brisbane, judging from the number and variety of fossil

leaves allied to this plant that have been found, there must have been many such trees in the forest, and as leaves upwards of 12 inches across have been found, some of these trees may have been quite large if leaf size be any indication.

Ferns, and seed-bearing plants so closely resembling ferns as to have been described as such, cycads and similar forms, and possibly grasses are allied to form a plant community of this time.

One can suggest the forest as having large conifers with gingkos and its allies as the tall timber; cycads, seed bearing fern-like plants or *Pteridosperms* and possibly tree ferns as the next height group and grasses and small bushes as the floor.

Many things remain to be discovered about this forest, and we have many fossil plant forms that, as yet, have not yielded up their story. Many fertile structures closely resembling flowers are known and one form *Williamsonia*, which may even be a flower, is not uncommon.

The forest of this time was rich in insect life, too. Close to Brisbane we have beds rich in fossil insects which range from the earliest of butterflies to cockroaches, the latter making up at least half of the insect fauna. Little is known of vertebrate life of this age. Odd *amphibia* are known, pointing to a few marshy places still around, and, later, we had dinosaurs of gigantic size, but there must still be a rich fauna to be discovered as we can hardly imagine such a wealth of plant and insect life without the higher forms as well.

Of course, change and decay were in these forests too, just as at present. Fossil wood showing the ravages of a Triassic borer is common, likewise fossil wood that shows evidence of fungal attacks to produce a "pocket rot" is found.

However, better means of seed dispersal were produced during these times and winged seeds known as *Fraxenopsis major* and *F. minor* developed.

By this means, no doubt the plant life was able to extend its domain and make up for decay and destruction in the older populated areas.

But changes must continue and eventually we reach the Tertiary period perhaps 50 million years ago. This is the dawn of life for the mammals and towards the end of the period man himself appears; and the forests and other plant communities of those days show forms that are still with us today.

In Australia we had mixed forests of beech, laurel, cinnamon and many other types of quite modern forms in the middle Tertiary period. Later on our well known eucalypt trees appeared and in old buried river silts and lake beds a large accumulation of leaves, fruits, seeds and nuts have been discovered. Beautifully preserved leaves in fine clay are common in parts of Queensland and very large leaves at least 8 inches across have been discovered. The

forests of those days must have been pleasant places quite like the bush of today.

Perhaps one million years ago great volcanic eruptions destroyed large plant communities, and in parts of Victoria for example, buried in the accumulation of volcanic ash, we have remains of blackwoods, banksia, eucalypts, bracken ferns, etc., that show quite definite evidence of the bushland of today.

It has been suggested that changes will take place in the future, too. The great variety of described eucalypts seems to indicate a species yet unsettled, thus it may be that a great plant species is still being evolved at the present time. What the result of this will be is not the study of the palaeobotanist, so we must leave the rest of the story to others, who pass the fossils by and consider the living plant and its varied forms.

Thus in a few words we have passed over some 500 millions of years with all the wonderful changes and enormous number of fossil plant forms. These with the rest of the fossil groups were referred to by Agassiz as "Concrete thoughts of the Creator", and as such are well worth the time and energy necessary to collect, study and learn the story they have to tell.

S.O.S. FOR NATURALISTS

Members are urgently requested to observe plants of *AMARANTHUS* both native and introduced species, especially those common to America. The officers of the Herbarium will advise members on the appearance and habitat of *AMARANTHUS* plants and flowers.

Please note whether or not the plants appear to be diseased and any species of wild bee seen visiting the flowers should be collected and forwarded to Tarlton Rayment, F.R.Z.S., 8 Bath Street, Sandringham, S.E.

Collectors are warned not to touch the bees with the fingers, but to take them in a killing bottle of methylated spirit. When the bees are dead, place them between cotton wool in a two-oz. tobacco tin for posting. It is not the sting that is dangerous. Enclose slip of paper giving collector's name, locality, date, and note any unusual feature of soil and weather. These data are sought by a doctor in America who has some evidence that these plants, and the wild bees associated with them, have an incidence on a dreaded disease of man which he is investigating. **THE MATTER IS OF ESPECIAL IMPORTANCE.**

MELBOURNE'S MANGROVES

In view of the note by Mr. J. H. Willis (*Melbourne's Mangroves are Dead!* *Vict. Nat.* Feb. '51.) an exhibit by Mrs. Pinches of leaves, flowers and root of White Mangrove was of special interest. The specimen came from an area at North Williamstown, at the back of the Williamstown Rifle Range behind the second series of butts. It was described as being larger than the area at Seaholme. Although much further from Melbourne, it is worth recording, too, that at least three healthy specimens are growing near the mouth of the Little River, near Werribee.

NOTES ON SOME AUSTRALIAN SPECIES OF HYDROCOTYLE

By N. A. WAKEFIELD

Observations in the field, and the perusal of numerous specimens in the main eastern Australian herbaria, indicate that the classification of some forms of *Hydrocotyle*, particularly those usually included under *H. hirta* (as by Bentham in *Flora Australiensis*, Vol. 3, p. 340), has hitherto been quite inadequate. Five of the species with which this paper is concerned were collected by Robert Brown, and his names for them were published by A. Richard in the latter's *Monographie du Genre Hydrocotyle*, 1820.

From other Australian species, those dealt with hereunder may be distinguished by the following combination of characters:

- A.—Stems perennial, creeping and rooting at the joints;
- B.—Carpels with obtuse dorsal edges (to exclude *H. pterocarpa* and *H. plebeia*);
- C.—Leaves not peltate (to exclude *H. vulgaris*);
- D.—Fruit on extremely short pedicels (to exclude *H. laxiflora* and *H. pedicellosa*).

The first two species are usually large-leaved and very hirsute, and can always be distinguished with certainty from any of the other four, by the numerous short hairs on the upper surfaces of the leaves.

1. *Hydrocotyle hirta* R. Br. ex A. Rich., 1820 (*Hydrocot.*, 64).

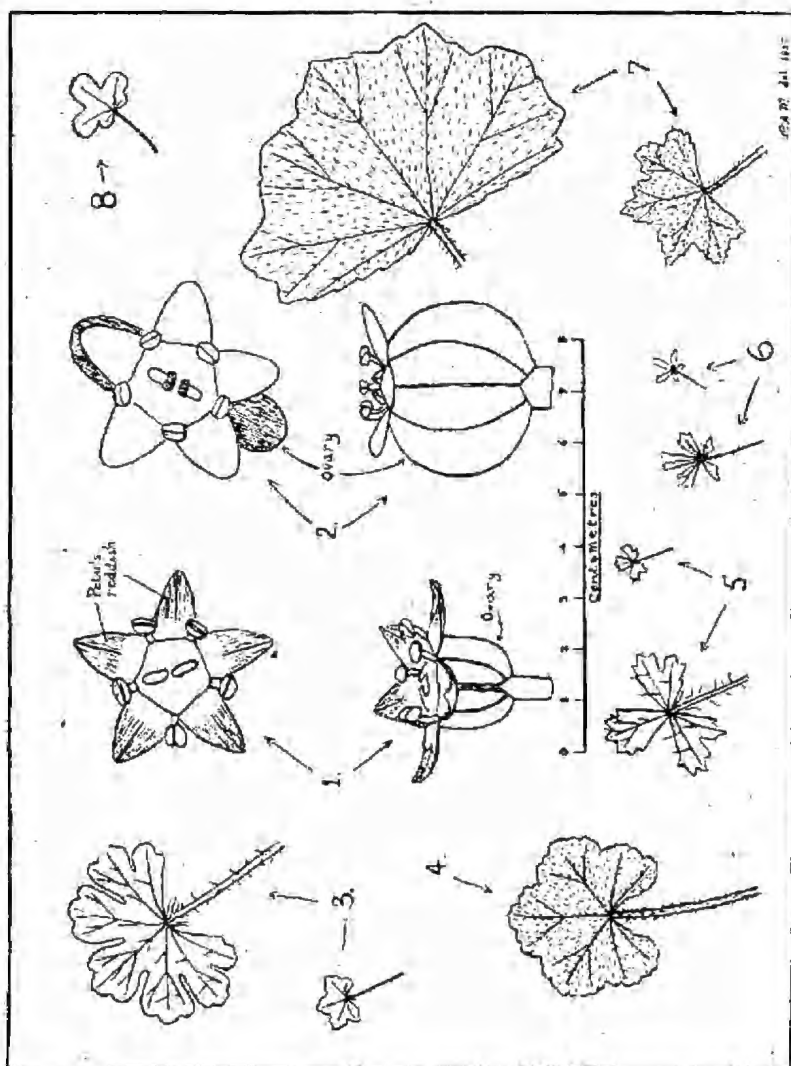
This species has an orbicular ovary broader than the tiny yellowish flower, and the fruit are apparently sessile in tightly packed globular clusters. Type came from Port Dalrymple, Tasmania, and the species ranges into Victoria, New South Wales, South Australia and Western Australia.

2. *Hydrocotyle acutiloba* (F. Muell.) stat. nov. [Syn. *H. hirta* var. *acutiloba* F. Muell., *Fragmenta* iv, p. 181, Dec., 1864].

The specimen in Melbourne National Herbarium, labelled, "Dawson River, F. Mueller," shall be fixed as TYPE, because this locality was cited by Mueller in the original description; and, as the collection is quoted by Bentham (l.c.), there is probably a duplicate of the type at Kew.

In southern New South Wales and eastern Victoria, the acute lobes and asperulous fruit of the type form are not so evident, but the species is distinguished with certainty from *H. hirta* in that the features of the inflorescence are those of the following three species.

The next three species are usually only slightly hirsute, while the upper surfaces of the leaves bear comparatively few hairs which are long, erect and setiferous; or whole plants may be almost or quite glabrous by reduction. The flowers of these three, and also of *H. acutiloba*, are reddish, and wider than the oblong



1. Flower of *H. peduncularis*, *H. tripartita*, *H. muscosa* and *H. acutiloba*;
 2. Flower of *H. hirta*; 3. Leaves of *H. peduncularis*; 4. Typical leaf of
H. hirta; 5. Leaves of *H. tripartita*; 6. Leaves of *H. muscosa*; 7. Leaves of
H. acutiloba; 8. Leaf of *H. intertexta*.

(Figs. 1 and 2 enlarged about 10 times; 3 to 8 as per accompanying cm. scale.
 All figures except No. 8 drawn from living Victorian material.)

ovaries, and produce a slightly loose cluster of perceptibly pedicellate fruits.

3. *Hydrocotyle peduncularis* R.Br. ex A. Rich., 1820 (l.c., 62, t.61, f.26).

The form described under this name by Bentham (l.c., 339) is an abnormally stipulate form of the species; whereas the typical plant, as figured by Richard, was placed by Bentham (l.c., 340) as "var. ? *pusilla*" of *H. hirta*. The variability of the plant has given rise to a number of synonyms, viz.—

H. pulchella R.Br. ex A. Rich. (l.c., 59); *H. elegans* A. Rich. (l.c., 58); both from Port Jackson; *H. Caudichandiana* D.C. (*Prod.* iv, 67, from Bathurst); *H. tasmanica* Hk.f. (in Hook. *Lond. Journ.* vi, 467); *H. elegans* Hk.f. (l.c., 468); both from Tasmania; and *H. hirta*, var. *glabra* F.Muell. (l.c.).

Type was from Port Dalrymple, Tasmania, and the species ranges through Victoria and New South Wales to South Australia and Queensland. The leaves may be large or small, shallowly or deeply lobed, and setiferous or glabrous.

The next two species are distinguished by having the leaves completely divided into cuneate segments.

4. *Hydrocotyle tripartita* R.Br. ex A. Rich., 1820 (l.c., 69, t.61, f.25).

This has 3-partite leaves, with the lateral leaflets bilobed. Type was from Port Jackson, and the species ranges from Queensland to Victoria.

5. *Hydrocotyle muscosa* R.Br. ex A. Rich., 1820 (l.c., 68, t.61, f.27).

This has tiny 5-partite leaves; the type was from Port Dalrymple, Tasmania, and the species ranges through southern Victoria into South Australia.

6. *H. intertexta* R.Br. ex A. Rich., 1820 (l.c., 63).

This is a Western Australian endemic, and has quite glabrous 3- or 5-lobed leaves. The type was from King George's Sound and two Max Koch collections from Pemberton (in Brisbane and Melbourne), show the character of persistent carpophores.

I am indebted to M. J. Leandri of the Paris National Museum of Natural History, for information pertaining to specimens dealt with by A. Richard, in whose herbarium are to be found the types (sent to him by Robert Brown) of the 7 specific names cited above from his monograph.

A QUERY

In the records of the *Pict. Nat.* the subject of the senses is neglected. For instance, have birds a sense of smell? How do they distinguish between poisonous berries and non-poisonous berries? Bats are known to have an almost radar-like sense of feeling. Do any of the other creatures possess this sensitiveness? And what about the sense of hearing? Do the blackbirds on the lawn hear the worms moving below the surface? Any comments!

—L.Y

NEW BEES AND WASPS — PART XV

Bees from Two Mountains, with Description of a New Species
and Notes on the Biology of Another

By TARKLTON RAYMENT, F.R.Z.S.

INTRODUCTION

Two male *Parasphecodes*, collected at Mt. Buffalo, Vic., and presented to the author by the courtesy of Mr. Hugh C. E. Stewart, of the Field Naturalists' Club of Victoria, raise the question of whether or not they could be males of *P. excelsus* Ckll., described from Magnet, Tasmania, and which is not close to any other known species. The altitude of Mt. Buffalo would, of course, cancel the difference in latitude, so that the ecological factors would not be dissimilar. Until the relationship is established, the Victorian males may be known as the Gentian Bees, and the description is appended.

PARASPHECODES GENTIANAE

sp. nov.

TYPE, Male—Length 9 mm. approx. Black, with a long narrow red abdomen.

Head black, almost circular from the front; face with much long white hair; frons having a scale-like sculpture, and close puncturing; clypeus produced, with a yellow mark, and rough, coarse punctures; supraclypeal area rising to a low carina that reaches the median ocellus; vertex shining, especially about the ocelli, long white hair; compound eyes reniform, converging below; genae rugoso-punctate, with white hair; labrum black; mandibulae black; antennae very long, black above, ferruginous beneath.

Prothorax not visible from above; pleura rugose; tubercles black with a fringe of white hair; mesothorax with a delicate tessellate sculpture and shallow punctures, a few white hairs; scutellum similar; postscutellum rougher; metathorax rugose, area with coarse longitudinal rugae superimposed on a tessellate sculpture, some white hair laterally; abdominal dorsal segment 1 black, with a reddish margin; 2 red, with a black triangular mark, 3 similar, 4-5-6 black, with a red lateral spot, punctures minute, some white hair laterally; ventral segments 1 to 5 red, 6 black.

Legs very slender, black, with white hair; tarsi black, with yellowish hair; claws reddish; hind calcar amber; tegulae black, shining; wings hyaline; nervures brown, first recurrent just inside the second intercubitus, second cubital cell higher than wide, only slightly contracted at top; pterostigma brown; outer nervures not weakened; hamuli seven, weak.

Locality: Mount Buffalo, Victoria, April 8, 1950, Hugh C. E. Stewart.

TYPE in the collection of the author.

Taken on two successive days on flowers of *Gentiana diemensis*.

A BEE CHANGES ITS HABITS

Time, with his inexorable digestion of all things, reduces the toughest of timbers to utter decay. The golden fibres of its glorious life are, at last, part of the elemental mud of earth. The gracious tree returns to the soil that gave it birth.

I say the wood is reduced to earth, yes, indeed, for there is little left to distinguish one from the other. See, I pinch a trifle of the punk between my fingers—it collapses, and few tears of water well out, as though the debris wept for the departed glory of the forest.

I am not the only one to perceive this gradual transformation from life to death. The bees, too, as though to refute those naturalists labouring to convince us that bees are mere reflex mechanisms, begin to fill again with life the dissolving cells of the tree.

For untold aeons of time, andrenid bees have invariably sunk their shafts in the ground. True, it took over twenty years of my life to discover that simple phase of natural history, but no matter, I know that all the species I have studied laboriously sink shafts in the ground. They have always done so, for they are miners by inheritance, by anatomical structure, by the insistent urge of instinctive tropisms—geotropism—the instinct to delve down into the darkness of the earth.

Who knows the subtle laws that drive an industrious wild-bee suddenly to desert the ancestral site of the nest, a crude shaft in the earth, to bore horizontal galleries in the debris of wood above the ground.

Let us pass from mere speculation to proved demonstrable facts. I take up the letter from my correspondent to re-read the succinct account—"Today, while I was cutting the decaying stump of a messmate tree, *Eucalyptus obliqua*, I came across several wasps in their nests, which were made at the ends of grub tunnels. You will find their eggs attached to some substance. What is it? I thought they may be of interest to you".

Of course they are of interest. The insects proved to be not wasps, but Australian wild-bees. Not every day is the naturalist favoured with indubitable evidence of an insect's abandoning the habits of its family. As this is the first account of the nest of this species, we should give honour to whom honour is due, and credit Cliff. Beaglehole with its discovery.

The cells are built of a dark-brown woody pulp, and are of an even texture comparable only to a fine moist silt entirely free from pebbles, sand, and other alluvial debris. I take a cubic centimetre of the punk and drop it into water—it floats with the buoyancy of cork. A similar volume of soil sinks instantly, and disintegrates.

Let us look closer at this bee which defies tradition, and abandons

the traits and industry of her family. A little less than half an inch in length, say, five-tenths of an inch, with a shining black head and thorax, and a dark blood-red abdomen; the legs show a little red on the shins, and the wings are dark, as though some reddish smoke had stained their pristine clarity. True, the harvesting hair of the legs is not reddish, but rather a dull-ivory colour, a trifle of no importance.

And her name? She has no common title, no vernacular to trip easily from the tongue. The scientist knows her as *Parasphecodes Wellingtoni*, for my late beloved mentor, Professor Theo. Cockerell, received her first from Mount Wellington in Tasmania, and named her after that mountain.

What, then, is she doing at Gorae, ten miles west of Portland, on the southern coast of Victoria? I postulate that she was at Gorae a long, long time before she slowly worked her way south, and up the 2,000 feet slopes of the mountain in Tasmania. She was in Gorae before the turbulent waters of the ocean, forever biting away at the coastline, finally severed Tasmania from the mainland.

The bee is small, and her power of flight limited to a mere few hundred yards, the small number of hooklets joining the fore and hind wings assure me of her aerial limitations. No hive—or wild-bee—could cross the waters of Bass Strait.

The small oval cells measured 12 mm. at the long axis and 5 mm. at the short, and so conform to the architectural principles of the bee-world. They are symmetrical chambers, exquisitely finished on the interior with a draping of impalpable silvery tissue—the dainty cradles of the young.

What of the puddings in the cells? Examined critically, the store of food provided for the baby bee is reddish in colour on the exterior, and perfectly spherical, for bees, unlike man, are able to build them so without recourse to any rotary movement.

Dry and mealy, there is little honey in the puddings, nor is there any need for a richer sweet, such as the miraculous predigested pap of the bee-hive, for *Parasphecodes* is a simple but vigorous species, well able to survive when the last of the foreign honey-bees will have moulded into dust.

The puddings are aggregations of pollen-grains, and with the assistance of the microscope, I shall discover which plants are favoured by the bees, and shall also learn a little about the flora of Gorae by a critical study of the pollen-grains. We shall also discover what she did, and where she spent her time on a certain morning in September, 1950. It is an interesting study, and more ennobling than tracking down some unfortunate fellow-bee for his crime, although the methods used in both cases are much the same.

With a scalpel I slice the puddings in half. The interior is of a brilliant golden-orange colour, so let us endeavour to trace the source of the colour. I spread a few of the grains on a slide, and

examine them under a high power. So, there are numerous microscopic golden globules distributed among the pollen. I add a drop or two of ether—the globules quickly disappear. I put a few other grains on a slide, and apply a biological stain, Sudan red. There is no doubt at all, the golden colour is due entirely to the presence of oil—a delicate fatty product of the plants.

I mix each pudding to an even consistency with a drop of glycerine, and examine a little under the lens. The grains, now stripped of their golden covering, resemble tiny glassy beads; they are indubitably the male cells of an Australian native plant.

Let us fall back to a little simple science, and apply a micrometer to the pollen. The grains are plain spheres, each 20 microns in diameter; that is, 50 of them would lie along a line one millimetre in length.

Number 2 pudding contains similar grains, but there are two or three strange triangular ones, perhaps from a species of eucalypt, and one or two are shaped like a tiny grain of wheat, probably from some leguminous plant. The "foreigners" are purely an accidental contamination, which is to be expected of any devoted lover of the flowers.

Number 3 gives a similar result.

Number 4 is contaminated with an odd grain, perhaps four times longer, and shaped not altogether unlike a miniature raspberry. This time I know it came from a wattle of some kind.

Numbers 5 and 6 are similar. *Paraspheroodes Wellingtoni* prefers some plant that yields golden spherical grains, and the collector should be able to furnish us with the botanical name, for the plant must be present in abundance.

The puddings have quickly dried quite hard. A pure honey and pollen mixture does not dry out, for the honey is hygroscopic, but the addition by the mother of some biological secretion alters the whole character of the pudding—and of the baby.

On each pudding is a small white egg, somewhat bowed. In a few days it will hatch, and a wingless, eyeless, legless grub begin its meal of golden pollen. Within a fortnight it will be fully fed, and then fall asleep for a month or two, until the miracle of metamorphosis is complete.

Three months later the restless males will emerge, and a few days after, the females will appear, for that is the invariable order of succession throughout the kingdom of the bees.

ERRATA

In "Victorian By-ways" (*Pict. Nat.*, April 1951), the following corrections are called for:

Page 244, lines 27 and 30, read *Palaeozoic* (not "Paleoic" or "Paleozic"); line 28, read *Mesozoic* (not "Mesozic"). Page 245, line 6, read *Derrinal* (not "Derinal"); line 9, read *Jurassic* (not "Tertiary"); line 30, read *Kosciusko*.

BIRDS, HERBS AND CHARCOAL

By EDITH COLEMAN

Once again sparrows are stripping leaves from their favourite wormwood. For the ninth year in succession a plant of Canary Islands pyrethrum (*Chrysanthemum plarnicaefolium*) has been denuded of leaves by the birds.

Again the English thrush (see *Vict. Nat.*, March 1950) has woven into her nest sprigs of lavender-cotton (*Santolina pinnata*). The nest is built in exactly the same place as last year's which I removed to examine. Her second nest was built on a branch only three feet distant, and along the same path, ten feet away, is a third nest in which four lusty young were reared. As there were no territorial disputes it is assumed that one thrush was responsible for all three of the nests. It was pretty to see the three young of the second brood sitting round a rock pool under gum trees, where the parents fed them. As fast as leaves fell into the pool the young birds pecked them out.

The frequent use of herbs raises an old question: Do birds know that they have antiseptic properties? Harry Burrell (*Emu*, 1914) describes the use of green leaves by some owl-nightjars. After the nestlings left he examined the nest. It was composed of dried leaves and small pieces of shredded bark matted together in layers with bird droppings:

Evidently owl-nightjars do not clean up after their young like most birds that build in the open, but simply cover the nest each night or early morning with fresh leaves for the comfort of the brood during the day-time. On this occasion the upper layer was snug and dry while directly underneath were fresh excretions.

More remarkable than the use of green leaves is the consistent use of charcoal by certain finches, first recorded by G. T. Hill (*Emu*, Vol. X, p. 289). The finches (*Poephila personata*) place pieces of charcoal with the eggs, which become discoloured by it. Mr. Hill writes (*Emu*, Vol. XIII, p. 195):

Although the habit is common if not general in the species I do not think it occurs in any others nesting in Northern Territory or N.W. Australia. The large size of the pieces of charcoal (about the size of the eggs) is somewhat unusual. I think it is usually in the form of powder and pieces about the size of grains of hemp seed. The habit is not confined to nests built on the ground but has been observed in nests built in bushes and termites' nests near Roper River, Northern Territory. Records of some 15 nests showed that all contained charcoal, and were built on the ground or in tussocks of grass.

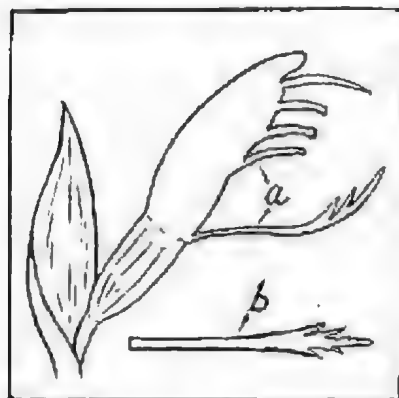
The use of charcoal is interesting in view of its modern use as a gas absorbent in gas masks, refrigerators, etc. Medical men prescribe charcoal tablets to absorb the gases generated by fermenting foods. Charcoal is advocated for the bottom layer of a compost heap. Had the finches discovered that charcoal kept the nests sweet? Is this one more lesson that man has learned from birds?

ABNORMALITY IN THELYMITRA FUSCO-LUTEA

By W. L. WILLIAMS, M.A., Dip.Ed., Melbourne.

In *The Victorian Naturalist* for November, 1944 (Vol. 61), on page 119 *et seq.*, I commented upon a number of botanical curiosities, among which was a teratological form of *Thelymitra fusco-lutea*. The plant referred to was collected close to the Terraces (Grampians) in 1933. In September last year I revisited the area, finding with some dismay that much of the natural growth along the once famous track to the Terraces had been destroyed in order to lay out a rifle range. It would seem that one needs to use some discretion now-a-days in visiting the expanse of Fringe Myrtle, Holly Grevillea, Nodding Blue-lily, mint bushes, and other lovely shrubs that still clothe the slopes behind the targets. However, to return to the now bare track itself.

At a spot where a good deal of digging and cutting had taken place there appeared a lone plant of the Blotched Sun-orchid, a tiny bract in the centre of the large solitary leaf indicating that barring accidents, which appeared all too probable, it would be likely to flower. Since clearing was still in progress, no compunction was felt at collecting the plant, together with a large potful of its natural soil—if one can call that curious mixture of yellowish sand and small stones soil!



Thelymitra fusco-lutea

- a. Column with abnormal processes.
b. Process flattened out.

On November 5 the first flower of the three on the spike opened, and to my surprise it exhibited the same abnormality noted in the 1933 specimen, collected about half-a-mile nearer the range. The two remaining blooms opened during the next few days, and were similar in every respect to the first.

The abnormality is a strap-like process rising in front of the column, in much the same position as that held by the labellum in a *Pterostylis* orchid. It is of approximately the same length as the column, is of a texture similar to that of the column hood and wings, and carries, toward the tip, five teeth, or points, the central one of which at least is glandular, as of course are the majority of the "teeth" on the normal column hood. In fact, the column hood and the abnormal process, viewed from the front, remind the observer of an upper and a lower jaw plentifully supplied with dentures;

while from the side the process is seen to be curved and recurved, so that its tip approaches rather closely to the long projections on the hood. The strap, quite narrow at its point of origin, becomes steadily broader until its margins, in the last third of its length, begin to break up into the serrations already mentioned. Its appearance is described at some length, because it will be interesting to discover if other observers have noted an irregularity of this kind (or of a different kind) in *T. fusco-lutea*.

The following questions, which will not be answered without further evidence, are nevertheless worth asking at this stage:

1. Since the tubers of both the 1933 and the 1950 specimens were moved before the flowering stage, had this disturbance, however slight, anything to do with the orchids' reversion to what was presumably an earlier form? (The process under discussion may well represent a shadowy relic of the missing anthers.)

2. In both specimens, and in all three flowers on each of them, the abnormalities were practically, if not absolutely, identical. Does this mean that each species of orchid which throws an occasional teratological form has its own particular method of doing so? (It seems, for instance, that *Glossodia major* may favour the double labellum, while *Thelymitra fusco-lutea* may favour this ligulate process, which, in fact, could almost be regarded as an extra, though strangely shaped, labellum.)

3. Since the abnormality was constant in all flowers on the specimens, can it not be affirmed that such a teratological abnormality belongs not to a single flower, but to the whole plant?

4. Since the 1933 specimen threw up abnormal flowers of the same kind for three years in succession, will the 1950 specimen do likewise? If so, what precisely does this mean, when we remember that a new tuber is made each season?

5. Supposing it were possible to germinate seeds of a teratological specimen (the ovaries are filling out at the time of writing) would the resulting progeny carry the same characteristic?

6. May not a mutation of this kind at some time have resulted in enough plants to constitute a new species? (I confess that I cannot think of a probable, or even a possible, example.)

The whole matter is somewhat bewildering, the more so to me because I have moved two plants only of *T. fusco-lutea*, seventeen years apart, and both proved abnormal. I have never noted any abnormality in plants of this species that have flowered *in situ*, and I have examined a reasonable number. Coincidence? Perhaps; but there still remains a number of other interesting questions in the list above.

CONGRATULATIONS

Members are happy to send their congratulations to an old friend and former office-bearer of this Club, Mr. Stan Colliver, who has just been elected President of the Field Naturalists' Club of Brisbane.

NOTES ON THE RED-BACK SPIDER (*LATRODECTUS HASSELTII*)

By J. ROS. GARNET

The interest aroused by an exhibit at the general meeting of the Club on March 12 last of a female of the above species of spider, together with her four egg sacs, has prompted an amplification of the remarks of both Mr. Willis and the exhibitor. The specimen was one of a pair collected beneath a brick dwelling at Pascoe Vale in February and March of this year. The genus *Latrodectus* is widely distributed in Europe, Asia, the Americas and Australasia. The Australasian species, *L. hasseltii*, is reported from Malaysia, India, the South Pacific Islands, Papua, Australia and New Zealand, in which latter country it is commonly known as the "Katipo". Here it is variously called the Red-back, Red-striped or Jockey Spider.

The Black Widow (*L. mactans*) is but one of three venomous species found in the Americas and, like our own Red-back, it has earned for itself a reputation for the severity of its bite. This reputation suffers, however, by comparison with that of the Southern Russian species *L. creberrus*, to which has been attributed the death in 1855 of some 70,000 sheep.

The Red-back is a shapely spider with long and slender black legs, small cephalothorax, and an almost pyriform and black abdomen, on the upper surface of which a conspicuously broad and bright red band stretches from the junction of the cephalothorax to the tail. A similarly coloured red patch occurs also on the under surface. In some specimens it may be pale pink, even white or brown. In the spiderlings there is not a trace of red; their abdomen is pearly white with two converging lines of black dots on the dorsal, and a black escutcheon enclosing a white shield on the ventral surface. Apparently the brilliant colour develops with maturity.

The spider is evidently nocturnal, customarily lurking in dark places during the daytime. Rubbish heaps, old tin, heaps of timber, rock crevices, paling fences—always close to the ground—are among the commonly reported situations where it is likely to be found, but it seems that those inhabiting bayside localities near Melbourne are just as likely to be found hidden among the foliage of tomato plants, beans and silver beet, and, perhaps, other low shrubs and herbs. Fortunately the spider is not aggressive and generally drops to the ground and shams "dead" when disturbed.

Being a field spider rather than a bush-dwelling species, it is reasonable to assume that its normal food requirements would include the insect (and animal) ground-dwelling inhabitants of such areas. In addition to slaters and various diptera its victims have been observed to include black field-cricketts, beetles of many species, moths, caterpillars, bull-ants and even small lizards and small frogs—most of which are abundant during the summer months. It will thus be realized that, in common with other spiders, the Red-back is likely to be well fed and at its maximum development in the late summer and early autumn. After egg-laying she will be much reduced in girth, and this condition will persist until food again becomes abundant.

In the autumn the spiderlings hatch and their demands for food are met first by eating one another, and then by those smaller, soft-bodied insects which also hatch during that season.

She appears to be a prolific egg-layer. John MacPherson, in writing an account of his observations of the spider and of its natural history (*Australian Zoologist*, 1935, viii (ii), 145-147), records definite egg counts of from 15 to 30 per cocoon, but such numbers are probably phenomenally low. Of 5 cocoons collected by the writer, the counts ranged from 150 to 325 in four instances, and all in one sac—this sac being the last of the four spun by the exhibit specimen. Why that fourth sac had been spun when she was unable to deposit further eggs is a matter for speculation.

The eggs hatch within the cocoon and by the time the spiderlings emerge (which is a matter of days, depending on weather conditions) their number is, without much doubt, drastically reduced. Thus, of the 325 spiderlings found

an opening the sac, possibly only about 150 to 200 would have emerged had they been left to cut their way out unhelpt. This assumption is based on the count of spiderlings which emerged unaided from the first spun sacs of the two female spiders which had been under observation by the writer. Each cocoon was about 1 cm. in diameter and well packed with eggs, and therefore each likely to have contained upwards of 300 eggs.

Although the species is widely distributed in eastern Australia from temperate zones to the tropics, it appears never to reach plague proportions despite the fecundity of the female. As mentioned by MacPherson, the egg sac is the first object of predatory attack—ants and parasitizing wasps being responsible for much egg destruction.

It is possible, as suggested by Mr. J. H. Willis, that harvestmen also help to keep the population at a reasonable level. He had noticed that Red-backs are few when harvestmen are abundant and vice-versa. One can well believe that these slender and long-legged arachnids would serve as potent controlling agents, for, as well as possessing a voracious appetite for spiderlings, they seem to experience no trouble in despatching spiders of considerably greater size. A lively account of the outcome of the meeting of a harvestman and a Cardinal Spider is quoted in the *Victorian Naturalist*, 1947: 63, 204. The redoubtable Cardinal failed to survive the meeting!

The Red-back is reputedly the only Victorian spider capable of inflicting a dangerous bite. That its venom is powerfully toxic is evident when it is considered that the severe reaction occasioned even in healthy adult human beings is due to the injection of a minute amount of venom. Experiments carried out by Dr. C. H. Kellaway, one-time Director of the Walter and Eliza Hall Institute for Medical Research in Melbourne, and reported in the *Medical Journal of Australia*, January 11, 1930, showed that the quantity of venom extracted from the head of one spider yielded about 3-4 mgm. of dried material (of which a portion only would be actual venom). Twice this amount was sufficient to kill a 415 gm. (a trifle less than 1 lb.) guinea pig in a little over two hours following intravenous injection. The same dose injected subcutaneously (which would be the form of injection most likely to occur in a natural bite) usually brought about the death of the guinea pigs within 24 hours. Of six smaller guinea pigs (250 to 300 gm.), each bitten naturally by a spider, five died in less than that time, a fact which further emphasizes the high potency of the venom. As Kellaway demonstrated, it is mainly neurotoxic—a characteristic of the venoms of the majority of Australian venomous snakes—especially of the tiger snake, death adder, copper-head, brown snake and the taipan.

CONCERNING RED-BACKED SPIDERS

In my Brighton garden, where children are constantly at play, we have waged a ceaseless war against Red-backs for the past 13 years. These sinister spiders were all-too-frequent under boxes, flower-pots, buckets and heaps of stones; their untidy webs quickly recognisable from the adhering leaves, dead slaters and beetle-backs. Usually they build low; but twice (including this last summer) they have resorted to staked tomato plants and "pitched camp" three or four feet above the ground. Why tomatoes, when there are plenty of permanent shady shrubs in the yard? This habit calls for much circumspection on the part of any tomato picker before he plunges a hand amongst the foliage.

During the past year or two, there has been a noticeable diminution in the numbers of our Red-backs and a corresponding increase in the local population of those curious long-legged arachnids called "harvestmen." The proportions may be quite fortuitous or due entirely to seasonal conditions, but I wonder whether the carnivorous harvestmen ever wax fat upon Red-backed spiderlings?

—J.H.W.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, May 14, 1951. The President, Mr. E. F. Lord, was in the chair and about 150 members and friends attended.

Miss W. L. Dunstan was elected and welcomed as a new Ordinary Member, and nominations were received on behalf of the following: as Ordinary Members, Miss Frances N. E. MacDonald, of 29 Wrixon St., Kew, E.4 (Miss K. E. Hall/Mrs. I. L. Edmondson), Mr. Edmund D. Gill, of National Museum, Russell Street, Melbourne, C.I. (Mr. A. A. Baker/Mr. H. E. Preston), and as Junior Member, Master David F. Keep, of 21 Harcourt Street, Auburn, E.3 (Mrs. M. E. Freame/Mr. A. A. Baker).

The Secretary announced that the Club's nomination for the Natural History Medallion for 1951 will be decided at the next Council meeting, and reminded members that their nominations must be received by May 28, 1951.

The President announced that, owing to the King's Birthday holiday, the General and Annual Meeting will be held on Tuesday, June 12, 1951.

The speaker for the evening was Mr. F. E. J. Ockenden, President of the Microscopical Society of Victoria. Mr. Ockenden gave a very interesting address and opened up a new world of wonder in displaying the details of nature as seen through a microscope. The wide range of subject, and the excellent presentation by means of the specialized equipment, made this a memorable night.

A vote of thanks was moved by Mr. A. S. Chalk and seconded by Miss I. Watson.

EXHIBITS

FUNGI—*Ammanita muscaria*, *Boletus luteus*, *Marasmius alliatus*, *Lactarius deliciosus*, and vegetable caterpillar—*Cordyceps Gunnii*.—Mr. P. Fisch.

LIMESTONE—Specimen of Mr. Gambier building stone, with pamphlet on same.—Mrs. E. O'Mara.

FLOWERS—*Acacia ilicophylla*, *Crotalaria laburnifolia*, *Darwinia citriodora*.—Botanic Gardens.

ALTERATION OF DATE OF JUNE MEETING

NOTICE: Owing to the Public Holiday, the JUNE Meeting will be held on **TUESDAY, JUNE 12, 1951.**

A REPORT ON EVIDENCE SUBMITTED TO THE PARLIAMENTARY STATE DEVELOPMENT COMMITTEE, OCTOBER, 1950, CONCERNING VICTORIAN NATIONAL PARKS AND NATIONAL MONUMENTS

(Report No. 4 of the National Parks and National Monuments Standing Committee.)

In September, 1949, the then Minister for Lands (Mr. Guthrie), speaking on behalf of the Premier, promised a deputation of representatives of organizations interested in Victoria's National Parks that the subject of their representations would be referred to the Parliamentary State Development Committee for immediate consideration and report.

Political considerations prevented the promised immediate inquiry, but following the change of Government the Committee was re-constituted in July, 1950, and the inquiry was commenced without further delay.

The Town and Country Planning Association of Victoria, very opportunely, had published its report on National Parks, and material was thus provided for the initial stages of the parliamentary investigation. The Association's report covered much the same ground as that dealt with in the report presented in June, 1948, by the F.N.C.V. National Parks and National Monuments Committee, but several new aspects of the case for development and extension of National Parks were considered, and some stress was laid on the necessity for planning for the future development of particular regions of the State—especially in relation to the establishment of new national reserves.

Evidence, in which the report was discussed in considerable detail, was submitted on behalf of the Town and Country Planning Association by its Chairman, Professor Brian Lewis, and Mr. F. M. Corrigan. Following their submissions Mr. Ian McLaren, Chairman of the Youth Hostels Association, and of the Committee of Management of Wyperfeld National Park and member of the National Parks and National Monuments Conference Standing Committee, presented valuable evidence. Mr. McLaren had, in past years, travelled widely overseas and during his travels had taken the opportunity to study the National Park problems of other countries. He was, therefore, in a position to testify as to the deficiencies and weaknesses in the present status and administration of our Victorian National reserves as compared with that obtaining in, for example, the U.S.A.

At the invitation of the Development Committee, Messrs. P. Crosbie Morrison, J. Ros. Garnet and the Hon. C. E. Isaac, M.L.C., respectively Chairman, Secretary and member of the National Parks and National Monuments Conference Standing Committee, attended on Tuesday, 3rd October, 1950, to present the views of the Conference and the numerous organizations they represented. The Committee, which consisted of the Hon. C. P. Stoneham,

M.L.A. (Chairman), the Hon. C. E. McNally, M.L.C. (Vice-Chairman), and Messrs. A. E. Shepherd, M.L.A., W. R. Dawnay-Mould, M.L.A., N. Barclay, D.C.M., M.L.A., and A. J. Frazer, M.C., M.L.A., with Mr. J. L. Gillies as Secretary, listened with obvious interest and attention to the argument advanced by Mr. Morrison, who was complimented by the Chairman on the manner and form of its presentation.

By way of introduction he reviewed the major influences which were behind the movement to gain proper recognition of the needs of our National Parks and which he himself directly represented at the inquiry. These were stated to include the Combined Societies' Conference of 1946-48, the Field Naturalists Club of Victoria, *Wild Life* magazine, the Natural History Class of the Council of Adult Education, the Royal Society of Victoria, and the Trustees of the National Museum.

After naming the other individual organizations which, through the medium of the National Parks and National Monuments Conference, were supporting the requests, Mr. Morrison put the propositions embodied in the nine resolutions adopted by that Conference (see *Vict. Nat.* 1949, 66: 6-7). He drew attention to the lack of definition of the State's dedicated areas, and suggested that several distinct types of reserve should be included in any scheme aiming at the conservation of fauna and flora and of sites of special interest; primitive areas, refuges, natural monuments and sanctuaries being among the types required.

For the consideration of the Committee he suggested that, for Victorian conditions, National Parks should be recognized as fulfilling the following functions:

1. Areas of natural country, permanently reserved and dedicated to the people; such parks are primarily recreational and include parking, picnicking and camping facilities and, where suitable, sports and playing fields (National Park).
2. Areas of natural country, permanently reserved for their natural beauty, and for the protection and preservation of fauna, flora and other natural features; parking, picnicking and camping facilities under supervision, but no sports ground (National Park).
3. Areas of natural country, permanently reserved primarily for the preservation of native fauna and flora—no roads within the park except for fire protection; foot tracks only for the use of the public (Primitive area).
4. Primitive areas for the preservation of rare endemic species, not accessible to the public; access under supervision for bona fide students and research workers (Refuge).
5. Areas sufficient to ensure the preservation of some special feature, for example the volcanic crater at Tower Hill, Kororo (National Monument).

Common to all these types are two over-ruling features—permanent reservation and sanctuary conditions for all native fauna and flora, whether on the State protected list or not. None of these features is mutually exclusive. One park could combine two or more or all five of them. It would be thus seen that National Parks, as understood by the organizations Mr. Morrison represented, fulfil a number of purposes—recreational, educational and conservative.

In dealing with the present condition of our existing National Parks he surveyed the history and development of the system of management now obtaining, and demonstrated, very clearly, that the lack of co-ordinated control was the fundamental factor in the static circumstances or even, often enough, deterioration of the parks. In regard to finance it was evident that nothing really worth while in the way of re-establishment or development could be achieved until it was recognized that their tourist value was not always the most important consideration governing the allocation of public moneys for their maintenance.

The misdirected "improvements" often undertaken by, or on the recommendation of Committees of Management, and the tendency of these Committees to let grazing leases within the bounds of the National Park, were examples of the abuses which could be removed only by proper statutory provision for finance for such parks.

From his references to the various overseas national parks, their number and area, and the comparisons made with those existing in Australia and, more particularly, in Victoria, the inference was obvious—that Victoria is at a serious disadvantage, at the present time, even when the comparison is limited to other States of the Commonwealth.

His concluding remarks embodied the specific recommendations of the F.N.C.V. Sub-committee, as stated in its Report of June, 1948, which were substantially endorsed and adopted by the Conference and which, in principle, were reiterated by the Town and Country Planning Association of Victoria in its recently issued report.

Following Mr. Morrison, Mr. Garnet began by dealing with the more detailed requirements of National Park legislation, but as it was obvious that there would be insufficient time, at this sitting, to cover all the aspects still requiring discussion, it was agreed to hear Mr. Isaac, who wished to make one particular recommendation before the Committee adjourned.

Based on his long experience in matters relating to forests and forest conservation, and on his recent travels in New Zealand and various Australian States (during which he had taken particular note of National Park administration), he had formed the opinion that it would profit the State if it were to establish a Ministry of Conservation. This Ministry would be responsible for all matters

connected with conservation in any form—including our National Parks.

After some further and informal discussion, the Committee adjourned, Mr. Garnet having been invited to continue his evidence on the following Tuesday. On Wednesday, 4th October, the Secretary for Lands (Mr. J. E. Hunter) gave evidence which, from newspaper reports, suggested that the Lands Department also favoured the creation of a statutory authority for controlling our National Parks. He, too, shared the view of the Conference, that an annual appropriation from general revenue should be allotted to the body entrusted with the care and management of these reserves. The only radical divergence of view from that unanimously held by the Conference delegates was that embodied in the recommendation made by Mr. Hunter that the Authority should be responsible to the Minister for Lands, should consist of the Minister (or, presumably, his delegate), and officers of the Public Works, Lands and Forests Departments. This body could be so established that, as the need arose, it would be able to draw on the experience of an advisory panel consisting of representatives of the State Tourist Committee and other government departments having interests in these reserves. As the scope of the Authority expanded the advisory panel could be strengthened by the inclusion of representatives nominated by naturalist, recreational and educational organizations.

Although Mr. Hunter's views were, not unnaturally, prejudiced in favour of his own department, it is evident that he, too, has been very concerned about the welfare of our National Parks. It is only fair to add that the Lands Department has been frustrated in any desires it may have entertained for improving the lot of some of these reserves by the limitations imposed by the very instrument to which it owes its genesis, namely, the Land Act.

As previously arranged, Mr. Garnet resumed his evidence on Tuesday, 10th October, and the whole of the sitting was devoted to a detailed consideration of the several general submissions embodied in the resolutions of Conference, in dealing with the present disabilities of the existing National Parks, in suggesting remedial measures, and emphasizing the need for new and carefully selected reserves, including national monuments of an historic character. In illustration of the various points raised a number of exhibits was tabled for reference by the Committee and these included the F.N.C.V. Report of June, 1948, "National Parks and National Reserves in Victoria," and a reprint of the Report of April, 1949, which was published in the *Victorian Naturalist* of May, 1949, vol. 66, pp. 4-11, together with the *Victorian Naturalist* of November, 1937, vol. 54, pp. 99-101, which contained a list of sites and objects worthy of consideration as National Monuments. These three documents were distributed to each member of the Com-

mittee. Other documents which were used as a source of reliable evidence, and either exhibited or loaned to the Committee, included *Walkabout* of June, 1950, pp. 29 *et seq.*, in which appeared an informative and thorough analysis of the National Park problem in Australia by Mr. John Béchervaise, and the *Saturday Evening Post* of 22nd July, 1950, wherein appeared a long article revealing that even in the U.S.A., where National Parks have long been regarded as sacrosanct, some of these reserves are even now in danger of irreparable damage resulting from "development" schemes sponsored by utilitarian interests. Mr. Garnet used this article to direct attention to the need for a very careful drafting of any legislation concerning the control and utilization of our National Parks.

The National Park Acts of both South Australia and Queensland were produced to show that Victoria would not be establishing a precedent in legislating for its own national reserves, but neither of the Acts quoted were recommended as a model for that which should be prepared in Victoria.

Mr. Morrison, in his submissions, had made it clear that this Act, which all were so anxious to see introduced to Parliament, should provide for the classification and definition of these reserves and, as indicated above, several classifications were listed. Mr. Garnet, in his opening statement, submitted a series of definitions which were based on those now accorded international recognition and he gave it as his opinion that such definitions should be accepted and officially recognized in this country.

Dealing with the financial aspect he indicated that his own appreciation of the needs of any statutory authority which might be created indicated an annual appropriation of the order of £50,000, which was the sum suggested as long ago as 1948 and, following its own assessments, also recommended by the Town and Country Planning Association in its recent report. It seemed evident that expenditure during the first few years of existence of the Authority would be relatively high if a start were to be made on all the immediately necessary tasks of rehabilitation, including boundary fences, enclosures for refuges and primitive areas, resumption of land for right-of-ways, construction of roads, tracks, huts, shelters and other essential amenities for the public, and the provision of suitable dwellings for park rangers.

The question of personnel of both the projected Authority and its employees, officers and honorary committees of management or advisory committees, was another very important subject that demanded close attention. Suggestions were made as to the qualifications that should be expected in the chairman, members and secretary of the Authority, in the rangers, inspectors and honorary National Park wardens, all of whom appeared to be a necessary part of the structure that should be created.

For the reason that the Authority would be concerned largely

with the formulation and direction of policy relating to what would be, in effect, mostly biological preservation and conservation centres. It would appear essential that its rangers and other key officers or employees should be trained by the Fisheries and Game Department and the Forests Commission, and, perhaps, initially seconded from those departments. It was for a similar reason that the suggestion was made that it would be entirely appropriate that the Authority itself should be responsible to the Chief Secretary, who is the Minister in charge of the Fisheries and Game Department—a department which already concerns itself with the conservation and protection of fauna—or to the Minister for Forests, who is responsible for the department administering the Act which governs the conservation of forests and the preservation of wild-flowers.

It did not seem reasonable further to burden the Lands Department with the responsibility for an administrative and executive organization whose relation to that department would be expected scarcely to extend beyond the functions of surveying and delineating the actual areas involved. As the situation existed at present, the Lands Department, although reasonably sympathetic to and considerate of the requirements of nature preservation, could act effectively only where the tourist potential of a national reserve was apparent, and the two factors—nature preservation and tourist potential, were not always reconcilable.

In outlining the functions of the Authority Mr. Garnet expressed the view that it could very well use part of its funds in publicity and educational programme through the medium of films and National Park handbooks. To demonstrate what could be done in this direction, attention was drawn to several exhibits, which were loaned to the Committee for its more leisurely inspection. These included the official guide book issued by the Trustees of the New South Wales National Park and the handbook of the Belair National Park, South Australia. By way of contrast the handsome but modest brochure recently issued by the financially-starved Committee of Management of Wyperfeld National Park was shown.

In referring to a large collection of *Victorian Naturalists* among the exhibits, it was pointed out that a vast amount of accurate information concerning our National Parks—particularly Wilson's Promontory—was available in the pages of these journals. Here was to be found the history of their reservation and development, reports on their biological survey, their geological character, and descriptions of all those features which give the parks their peculiar attractions to both the tourist and the serious student. In these journals was assembled much of the material for first class handbooks, and it only awaited suitable compilation and finance to produce them.

At the conclusion of his evidence the Chairman thanked Mr. Garnet for his valuable assistance in helping the Committee to

gain a clear and comprehensive picture of National Park requirements, and it was suggested that he might again attend at a later date to answer any questions members of the committee might wish to ask, after they had studied the proposals.

In returning thanks for a very patient and friendly hearing, he referred the Committee to a list of names of individuals who, he believed, could supply authoritative evidence on special aspects of National Park management and fauna and flora protection and preservation.

—J. ROS GARNET.

FLOCKS OF HOARY-HEADED GREBES

The following notes amplify those on the recent influx of Hoary-headed Grebes (*Podiceps poliocephalis*) at Altona Salt Works, reported in *Vict. Nat.*, April, 1951. In the first week in March, what was estimated as 1,000 of these birds appeared on the Bridgewater Lakes (12 miles from Portland) and stayed two days. The usual grebe population here may be half a dozen, and it is not a common species anywhere in the Portland district. At the same time, 300 of the same species were on the Lagoon at Nelson.

Dr. Graham Brown, from Colac, and Mr. J. B. Ponder, from Corio, reported no noticeable increase of grebes in their areas. The prevailing drought in south-western Victoria may have been responsible for the congregation of the birds on two of the remaining waters (at Bridgewater and Nelson), but why the simultaneous appearance and then disappearance?

A report has also been received from Mr. Max McGarvie, Pomborneit East, who writes:

"On February 19, a day of heavy rain and very strong east wind, I found these birds in hundreds on Lake Corangamite, sheltering in the lee of the long points of rock which jut out into the lake. They were very quiet and inquisitive, and I was able to get a rough count. There were twelve separate flocks in about a mile, and each contained from 68 to 175 birds, so probably over 1,000 birds were present. This is the largest congregation of these grebes I have seen, though they are always fairly common on the Lake from late summer to end of winter."

So here is another large flock of Hoary-headed Grebes. This fact, together with the reports from Werribee and south-western Victoria, makes the question harder to answer—where did they all come from?

—NOEL LEARMONTH (Portland).

OBITUARY

Mrs. Edith Coleman

Just as this issue goes to press, word has been received of the death (suddenly) of Mrs. Coleman, at Sorrento.

Mr. George Lyell

The death of our esteemed member, Mr. George Lyell, on May 19, is recorded with regret. Mr. Lyell was renowned in the world of entomology, and in 1946 he completed the gift and transfer of his own magnificent collection to the National Museum. A detailed account of his work is in preparation and will appear in a later issue.

THE NATURAL REGENERATION OF SOME TREES AND SHRUBS AT WALPEUP, VICTORIAN MALLEE

By H. J. Sims, West Coburg

Murray Pine

The Murray pine (*Callitris glauca*) is highly regarded both for its ornamental value and its timber. The death of very large numbers of these trees during drought periods (particularly 1929 and 1943-45) therefore causes concern. Mortality was particularly severe during the latter drought period. For example, in an almost pure stand of pines which encircled the playing arena on the Walpeup Recreation Reserve, it is estimated that 90% of these trees died. Suggestions concerning the cause of the deaths included drought, insect attack, dust-laden atmosphere, higher transpiration due to the clearing of surrounding farms, and natural senility.

The drought of 1943-45 was particularly severe. The rainfall at Walpeup in these years was considerably below the average in each year.⁽¹⁾ and also much less than in any other three-year period. Records at Wentworth, N.S.W. (supplied by the Commonwealth Meteorological Bureau), showed that these years were easily the driest three successive years since 1868, when records were first taken. However, during this drought period, other trees in the district, including belah, buloke, mallees and cattle-bush (locally called "cabbage tree") showed no similar mortality.

Examination showed that practically all the pine trees had been attacked by jewel beetles (*Diadoxus erythrinus* and *D. scalaris*). It is considered that the mass deaths were due to a combination of drought and insect attack. It is interesting to note that the same two factors—drought and insect attack—have caused severe mortality (up to 90%) in several species of pines in California⁽²⁾.

Zimmer⁽³⁾ considers that Murray pine requires associated protection, and will not tolerate isolation caused by clearing; it seems incapable of adapting itself quickly enough to survive after general clearing for cultivation.

Some district people thought that dust on the pine leaves may have caused suffocation of the trees. The factor of senility and consequent lack of regeneration has been considered a cause of mortality amongst mulga in western New South Wales⁽⁴⁾.

There has been little regeneration of Murray pines in the Walpeup district in the past twenty years, and young trees are comparatively rare. In the early 1930s, isolated young trees were observed. A curious feature was that most of these young trees grew at the base of hophush (*Dodonaea*), usually within a foot of the bush. The hophush apparently provided suitable seed bed conditions by the accumulation of leaves and other debris, by directing rain-water down its stem and concentrating it near the base, and by providing some protection from rabbits. In recent years no young plants have been found under similar conditions.

At the Mallee Research Station at Walpeup, an area of 124 acres is reserved as a homestead and shelter area. Farm livestock have been excluded from this area since 1939, and practically all the rabbits have been eliminated. In this reserve Murray pines occur as areas of pure stand, and as scattered trees. A large number of trees died during the 1943-45 drought, the mortality being 72% in one sample area⁽⁴⁾.

Two areas have been found in this reserve, and in an adjacent shelter belt, where natural regeneration has occurred, and occasional single young trees are present. The two areas of regeneration are located on hollows formed in an old track (said to be the original Swan Hill-Pinnaroo track) through the reserve. The young trees were found in 1946, when they were less than a foot tall. The majority of the young trees are growing in hollows where extra water collects, but some are on the adjacent normal surface. In November, 1950, one group consisted of approximately 15 trees, fairly close together, while the other group, consisting of some 30 trees, is more scattered. The trees averaged about four feet in height. Some were eight feet tall, whilst the smallest were less than one foot. Several of the trees that were over three feet tall were bearing cones.

It is considered that the absence of regeneration has not been due to any lack of viable seed. Seed cones collected in the area have given seed that has germinated satisfactorily in seed beds. Each year, a number of pine seedlings germinates in a garden in this homestead reserve, and some of the seedlings have been transplanted successfully. The most obvious differences between the garden area and the reserves is that the garden is cultivated, watered and is rabbit-proof. All these factors are known to be very important^(6, 7, 8). In the Walpeup Recreation Reserve, which is enclosed by a rabbit-proof fence, different areas have been cultivated annually since 1946, but no young pine seedlings have appeared. No check has been made, however, to determine if the few trees remaining in the area are producing viable seed.

The importance of additional water for the establishment of young pines has been demonstrated in two other instances. Firstly, a large number of Murray pine seedlings have been found around a stock dam (or tank) on an adjacent farm, and the farmer has transplanted some of these around his farm buildings. The second instance concerned the regeneration of a patch of scrub pine (*Callitris verrucosa*), which was noted on the Walpeup-Patchewollock road in 1946. These young trees occurred around depressions where water had collected after rains.

Mallee Eucalypts

Young trees of the various species of mallee are very seldom seen, and many people have thought that the seed of mallees has

a low capacity for germination. However, Pescott⁽³⁾ and Zimmer⁽⁵⁾ have refuted this viewpoint. Natural conditions apparently do not favour germination. Most of the natural "regeneration" of mallee is "shoots" which grow from rootstocks left in the ground during the clearing process.

Three cases of germination and growth of young mallees have been noted—and in all, the circumstances have been similar. At Walpeup in 1938, mallee boughs were cut and laid in rows parallel to a fence, to act as "sand traps" to prevent sand blowing on to the fence. The boughs were left in position over the winter of 1939, and next spring a number of seedling mallees were observed. A similar observation was made east of Beulah, where in 1941 boughs were placed to prevent sand drifting into a stock channel. A similar germination occurred, and in 1947 flourishing bushes up to five feet tall were present on the site, which was protected from stock. At Lascelles in 1945 a farmer placed mallee boughs on hard "blown" areas on a sandhill to catch moving sand there—and a similar germination of young mallees occurred.

Other Species

It has been noticed in the Walpeup district on several occasions that, when land previously cleared and cultivated is left undisturbed or only lightly stocked for several years, the first shrub that regenerates is hopbush (*Dodonaea attenuata*). In some cases, the regeneration has been quite rapid and has given a thick stand. The winged fruits of this shrub are carried for longer distances by the wind than are those of other local trees and shrubs. Young cassias (*C. Sturtii* and *C. eremophila*) are frequently noted in areas that have been left out of cultivation. Germination seems to occur most prolifically after heavy rains in late summer.

Young belah (*Casuarina cristata*) trees are not numerous, and have not been observed in areas where mature trees are fairly thick. Young specimens of various ages are found on the grassed areas that occur throughout timber and shelter reserves where mature belah trees occur.

The seeds of quandong germinate readily and young quandong trees occur throughout uncleared areas. Large numbers of young weeping pittosporums have been noted around parent trees. Young cattle bush ("cabbage trees") are also readily found.

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NOTES FROM THE WILDFLOWER SANCTUARIES

LONGWOOD AND TALLAROOK.

The Longwood area was suggested to the Country Roads Board because attractive orchids (notably *Caladenia caerulea*), which flower during August and September, had been found along the Highway near the 32-mile post. The C.R.B. agreed to fence a strip of 100 yards by about 20 yards, and results have already been most gratifying. Thus the 30 members who journeyed there by coach on October 21, 1950, were impressed with the spring showing in and around this enclosure. *Pultenaea Vrolandii* (of limited distribution) was nearly finished, but *P. laxiflora* was in full flower. Early flowers of the deep blue Finger Flower (*Cheiranthra linearis*) had already emerged, with a wealth of native orchids, which included several new additions to Miss W. Waddell's list in the *Naturist* of September, 1949, viz.: *Caladenia cyathata*, *Thelymitra antenniferi*, *T. aristata*, and *Diuris palachula*. Amid more showy subjects in flower, closer examination revealed the presence of miniature species of *Stylidiaceae*.

At Tallarook, an area of about four acres, named after Mr. C. Boulton,* chairman of the Reserve Committee, who takes a keen interest in the project, has been set apart in the Recreation Reserve and declared a sanctuary by the Shire of Seymour. The number of different native flowers flourishing within the substantial fence is remarkable. Outstanding, since the wiring, is the increase in Grass Trigger-plants, very few of which were in evidence last year. Orchids noted in bloom were *Caladenia dilatata*, *C. angustata*, *Calochilus Robertsonii*, *Thelymitra aristata*, *T. setoides*, and *T. rubra*. *Diuris sulphurea*, in no uncertain way, demonstrated the value of protection; lovely heads of this splendid orchid were admired in large patches everywhere. The only addition made to the local census was *Leptospermum myrsinoides*, but other finds made earlier in the year include *Tetratheca crassifolia*, *Dillwynia parvifolia*, and *Pultenaea laxiflora*, bringing the total number of species on this four-acre patch to 112. The sanctuary would be really spectacular about the middle of November, when Finger Flower (*Cheiranthra*) and Blue Pincushion (*Brunonia*) are together in the zenith of flower. A most attractive aromatic shrub is *Helichrysum obcordatum*, of a quality and substance equal to (if not better than) that encountered in the Bendigo district.

Our last stop was made along the railway line close to Broadford, where a particularly fine display of flowering shrubs and ephemerals occurred.

These sanctuaries are striking examples of the prolificacy and colourful beauty of the native flora, when given a "sporting" chance to survive by mere protection with wire netting. The Native Plants Preservation Group, under the capable direction of Miss Waddell, is to be congratulated on the fine work already achieved in this respect, and upon the sagacity in enclosing spots on or contiguous to main highways. The experiment begun justifies many more enclosures in suitable positions along this and other routes.

A surplus of £4/4/- on the trip was credited to the much-needed funds of the Group.

—A. M. BLAXTON.

* Since this report was received, the death of Mr. Boulton has been announced.

DISCOVERIES ON COBURG PENINSULA, N.T.

By LIONEL A. GILBERT, Nabiac, N.S.W.

Cape Don, on the Coburg Peninsula, is an interesting place. When approaching it by sea, the lighthouse set on a high hill first meets the eye. Dark mangrove swamps fringe the Cape, and seawards from these are coral reefs, through which a swift current—the "rip"—swirls, often making the sea very choppy. On the trip out, an occasional flying fish or turtle may be seen.

By careful navigation through the reefs, a small bay is entered. The water is calm and all is quiet—the surrounding mangroves seem to absorb all sound. At the innermost part of the bay is a small stone jetty, which carries a narrow footway beside a trolley track on which provisions are loaded and pushed up the hill to the lighthouse and dwellings by means of manpower. Three houses, a storeroom and the lighthouse itself are made of concrete bricks. (Originally the trolley track ran through the bush for some three miles to Alkari—a place with fine beaches but no surf. Sand from here was used to make the bricks, which were conveyed to the construction site by horse-drawn trolleys.) In the gardens, irangipani and bananas do very well, and here and there are pieces of metal—relics of a German aeroplane forced down some years ago.

Once above the level of the swamps and the pandanus thickets, refreshing sea breezes blow in from any of three sides, and there is a fine view of the sea, with Melville Island in the distance to the west.

At the lower level of the hill, pandanus thickets grow in sandy soil, after which there is a sudden drop to the sand-and-mud flats at sea level. Crabs, molluscs, mosquitoes, mud-skipper, and giant *Bruguiera* comprise the main forms of life from here onwards towards the sea.

Some distance from the houses a tidal well in a pandanus thicket provides fresh water when the tanks run low during the long dry season that follows the monsoonal rain in summer. A flock of goats grazes around the grassy hilltops: some members of the flock deserted, and have become nomads in the bush, though these are seldom seen.

Whilst out gathering firewood one day, we were about to load some small logs of ideal size when a native stopped us. He pointed out that this was a burial ground and explained that after burials a *carroboree* was held, and the logs piled over the graves to mark them. Old bailer-shells (*Melita diadema*) were nearby, these had been used for excavating the graves in the sandy soil. If a white man burnt, or otherwise disturbed the logs, the action would be looked upon as being due merely to ignorance, and nothing would come of it; but if a native should perform a similar act of sacrilege, severe punitive action was apt to be taken.

The nearest native camp was on the sandy flat, south of the lighthouse. What a sand-fly-ridden site it must have been! These insects swarmed out of the sand and swamps at low tide and at dusk.

Most natives had markings across the chest, across the thighs, and downwards on the upper arm—perhaps three or more incisions being made, and allowed to form weals. (The razor-blade has apparently taken the place of the stone knife in many cases.) Some of the natives here had been evacuated from the Croker Island Mission, owing to the war; others had been in Darwin during the early air raids in 1942. One old native, Larry, who sometimes wore a large brass plate, had once been a blacktracker. He solemnly told me that some of his people would always be there, as two of his picanninies were buried out in the bush. He rather resented the influx of whites.

There came to our camp rumours of a collection of bones some miles away in the direction of a place called Calduc—allegedly "the place of the devil". Accordingly, five of us set out early on August 31, 1944, to see this place with the fascinating name. There was a reasonably well defined track to Calduc, which we followed. The bush all round had been burnt out by recent fires, and so botanical collecting was almost impossible. The only noteworthy plants seen were trees—orange-flowered *Eucalyptus miniata*, *Grevillea chrysodendron* and an acacia with almost white flowers. Other plants, and the animals noted in this area, have been outlined elsewhere (*Vict. Nat.*, May, July, 1947; Aug., Oct., 1948) and need not be repeated.

A mile or so along the track, signs of natives' activity became evident. Trees were often found hewn down, where the natives had discerned bees' nests and removed the honey, or "sugar-bag" as they call it. This reminded us that on one occasion a notice came from Army H.Q. stating that if any camp wished to start a garden, it would probably be found necessary to hand-pollinate pumpkins and other cucurbits owing to the lack of suitable bees in the area.

Native Burial Ground

At about six or seven miles from our starting point, the coast was approached once more, and in a dried-up melaleuca swamp a native well was found with a heap of the shells of a bivalve mollusc beside it. Between this swamp and the mangroves bordering the sea some 100 yards away was a raised strip of sand, on which grew a few coarse tussocks and some pandanus palms. It was here that we saw a structure which looked like a ruined mia-mia, but on closer examination appeared to be a grave platform. We wished to examine this, so one of our members went ahead to a small native camp on the sandy flat near the mangroves to talk to the natives, and see what he could find out about the place.

Originally there had been four forked upright posts, only one to two feet high, supporting the structure, and a couple of them were still in place. All round, and in between these uprights, was a tangled mass of poles and strips of bark. Some was paperbark from *Melaleuca leucadendron*, of which there were numerous specimens in the locality, while other types of bark had been obtained by cutting it in a scallop formation. At the end of the grave nearest the camp was a small tin trunk, partly covered with pieces of bark. About a foot from this trunk, lying in the open, was a bleached skull. The lid of the trunk was raised, and within was seen another skull, a mass of bones, and a tangle of rags, such as pieces of decayed blanket, etc. The pattern on the blanket was still discernible. We lifted our pieces of rotting blanket and flour-bag in order to examine the contents of this curiously shaped trunk, and yet another skull was revealed, complete with lower jawbone. Meanwhile, on raising some of the bark on the other part of the grave, more bones were seen in a disorganized heap, with pieces of red cloth, and other remnants mingled with them.

More bark was removed, and other articles, such as bottles and a bundle of rotting white rag, came in view. The bundle, about one foot by two, contained an almost complete skeleton, with skull, ribs and long bones, all lying side by side in a rather tidy fashion. In the bundle cockroaches were plentiful. An attempt was made to lay out this skeleton, but some of the vertebrae were missing, there appeared to be three patellae, and no phalanges were found.

The striking features of this grave were the trunk, and the utter tangle of bark, poles, bones, rags, etc. There was apparently little or no attempt to lay out the remains, and it was evident that some, if not all, of the bodies had been buried, or otherwise disposed of, elsewhere, until they had deteriorated, and then an exhumation carried out. (This practice is followed in certain parts of the northern area of Australia, yet a few miles away we had to be careful not to disturb what appeared to be the permanent graves of other natives.)

The other member of our party now returned and behaved in a most curious fashion. He lit a fire, and promptly disrobed and stood in the smoke, all the while jumping and scratching most violently. We learned that the adjacent camp was teeming with fleas—small black ones, with a tick-like capacity for "digging-in". Neither smoke nor scratches perturbed them in the least. Each had to be dealt with individually. He reported that the natives in the camp regarded the place unfavourably, although living so close to it. Apart from that, no information could be obtained.

It was decided to have lunch, so we proceeded to the camp. There were few natives there, but a number of ruined mia-mias and heaps of shells everywhere. On asking an old naked man how to get to the water for a swim, he understood with difficulty and

eventually pointed towards the mangroves nearby. Through a small opening we entered the swamp near a dug-out canoe with its bait-shell inside, moored to a stick. The swamp itself was foul-smelling, slimy and very dark. The tide was well out, and so all thoughts of swimming were abandoned.

After lunch we gathered together such food as was left, and returned to the natives' camp. The fleas were now attacking in earnest. Woollen socks were crawling with them, although we had not actually stopped in the camp itself: the fleas had attacked as we walked.

Flea-ridden, and rather uneasy, we returned to the grave and had another look through the heap of bark. Further strange things were found: bottles; jars; a glass tumbler stuffed with decayed rag; a few rusty tobacco tins; a mustard pot with a silvery lid; a leather purse (probably made out of boot leather); some fibre, which we thought was probably made from hair; some nails in a tin and others tied to a string. This string was also tied to a disc—a dog registration tag bearing the date 1924 and a number. A shell of a cigarette lighter was also found, a small metal cylinder, a bowl of a pipe, and pieces of charred leather.

The bones were replaced in the trunk and ruined structure, and everything left in the same state as we had found them. Possibly the tin trunk may have been acquired from the outlying missions, or from a former Protector of Aborigines in the area. We found the reports about bones to be correct, but hardly expected to find four skeletons in such varied conditions—one rolled up, two spread all over the place, and parts of another with an extra skull in a tin trunk—with natives living about a hundred yards away under the most primitive conditions imaginable.

"AUSTRALIAN SHELLS"

(By Joyce Allan, F.R.Z.S.)

Conchologists and shell collectors now have access to a well-illustrated up-to-date reference volume covering the whole Australian molluscan fauna. This is something that has been sorely needed for many years, determination of specific names for Australian shells in most cases requiring reference to old volumes and scattered writings not even available in all our major scientific institutions.

In Miss Joyce Allan's recent 470-page handbook (published by Georgian House, at £3) there is an introductory section dealing with interesting phases of molluscan life history (although it is admitted that specific information is not yet available for many Australian forms). One hardly thinks of "courtships" among these lower invertebrates; but from Miss Allan's personal observations, a patient observer would find much fascination in a survey of just this section of the mollusc's life story.

To the helpful notes on collecting, cleaning and preserving shells, is added a plea for the avoidance of wanton destruction; it is suggested that rocks turned over in search of specimens be replaced as near to the original position as possible and also that unwanted live specimens be returned to suitable environments. It is good to see this point stressed, because much damage is often done by thoughtlessness and the writer well remembers one occasion when he spent his whole collecting period in replacing rocks that were being overturned by others who did not bother to do so.

The main portion of the book is concerned with descriptions of the shells illustrated, and, although short, these are usually sufficient to track down a name if used in conjunction with the plates and the geographical information given. Classification follows that of Thiele and there are popular family headings, such as "Tritons," "Cowries," "Cone Shells," etc.

Miss Allan's recognized skill is apparent in the twelve superb colour plates, almost perfect for their objective, these, together with photographic plates and text figures, illustrate 1240 species of shells. With additional information in the text, some 2000 kinds can be named and this is a large proportion of the forms that one may reasonably expect to find, without deep sea dredging or searching for almost microscopic types.

It is unfortunate that the photographic reproductions leave so much to be desired. On the plate facing p. 128 it would certainly be impossible to compare fig. 24 with an actual specimen and the same would apply to figures 12 and 18 on the plate facing page 145. These are not isolated instances of what seem to be the result of bad exposures.

Likewise with the text figures, in many cases generic determination would be difficult. We can be sure that the fault does not lie with the artist, as Miss Allan's clear black-and-white line drawing are a feature of the *Australian Museum Magazine* articles on shells. What these drawings could have been, is apparent if we compare, for example Text Fig. 43 (Turrids) with any plate in *Bulletin of the Auckland Institute and Museum* (No. 2), which deals with the New Zealand shells of the same family.

The lack of plate numbers on the actual plates is a distinct disadvantage when attempting to refer to figures from the text—one has first to look up the list of plates (on p. XI), then turn to the page that is opposite the illustrations desired. There is no similar difficulty in referring from plate to text because page numbers are given after names at the foot of each plate.

It would be foolish to expect everything about every Australian shell in a book of 470 pages, as the author explains, but personally I could wish for some reference to older well-known names (now in synonymy), and authorities for names, as a quick means of checking back to earlier papers. Full synonymy is not necessary in a popular work of this type; but many keen collectors do have earlier papers available and such a reference would be a guide between this, the latest work on Australian shells, with modern nomenclature, and the earlier work with scarcely an identical name. As stated in the text, one can always obtain such information from a museum, nevertheless, not all Australian museums have a conchologist and not all collectors live near museums. The writer remembers his early days when visits to a museum were only at annual holidays and letters seeking information had to be confined to one or two specific problems. Anything that can help the collector to find things out of his own accord is well worth-while, for the self-discovered information is retained more easily.

Without quibbling over the choice of examples, one notes a certain lopsidedness in places, e.g. among the air-breathing snails considerable space is devoted to the genera *Pediogyra* and *Pygospio*, but no mention made of the large jet-black and very attractive *Porypanta*, from Victoria.

A handy glossary and an index complete the volume. Throughout, this book is a mine of information and a pleasure to read, such descriptions as that of the extremely rare Glory-of-the-sea Cone are stimulating. The price is high unfortunately, and thus many of the younger naturalists will not be able to own copies. With publishing costs as they are, it is a wonder that such a book came to be printed at all. We whose interest lies with shells are extremely grateful to Miss Allan for her long painstaking work over the years that made the book possible, and to the publishers who have done a magnificent job in producing it so attractively.

—S. F. COLLIVER

(Keeper of the Collections, Department
of Geology, University of Queensland).

WHAT, WHERE AND WHEN

Reminder:

King's Birthday Week-end, June 9-11—Refer to May *Naturalist* for details of various day excursions to link up with week-end party.

General Excursions:

Saturday, June 23—Croydon to Ringwood, 3-mile walk. Subject: "Simple Introduction for Beginners to Gums and Wattles." Leader: Mr. A. J. Swaby. Train: 1.35 p.m. from East End No. 1 Platform. Book 2nd return Croydon.

Saturday, July 7—National Museum. An afternoon with Mr. W. B. Hitchcock, Ornithologist to the Museum. Subject: "Birds." Meet main entrance, Russell Street, at 2.30 p.m. Club leader: Miss M. L. Wigan (BJ 3601).

Preliminary Notice:

Wyperfeld National Park—Further details to those appearing in February *Naturalist* are that the party plans to leave Melbourne on Saturday, September 8, by private car, and to camp in the Park. Members will need to bring their own tents and to cater for themselves. Meat, bread and tinned food can be bought at Rainbow, by arrangement, on the way. Miss M. Elder, 17 Adelaide Street, Malvern (IJ 7297) would like to have additional names by the end of July.

Group Fixtures:

Saturday, June 16—Botany Discussion Group. Afternoon walk, Bayswater to Heathmont. Train: 12.54 p.m. from Flinders Street. Book 2nd return Bayswater.

Tuesday, June 19—Native Plants Preservation Group. At home of Miss W. Waddell, 3 Denham Place, Toorak, at 8 p.m.

Monday, June 25—Botany Discussion Group. Royal Society's Hall, 8 p.m. Subject will be announced at General Meeting. Hon. Sec.: Mrs. A. Osborne, 21 Renwick Street, Glen Iris, S.E.6.

Tuesday, July 3—Geology Discussion Group. Royal Society's Hall, 8 p.m. Subject: "Fossil Invertebrates—Their Life and Form." Third Group, "Anthozoa—Corals," by Mr. A. A. Baker. Hon. Sec.: Mr. A. A. Baker, 53 Carlisle Street, Preston.

Saturday, July 7—Geology Discussion Group. Excursion to Cave Hill Quarry, Lilydale. Particulars at Monthly Meeting.

Saturday, July 7—Marine Biology Discussion Group. Meet at the National Museum, Russell Street, at 2.30 p.m. Hon. Sec.: Miss C. Walker, 530 Burwood Road, Hawthorn, E.2 (WA 3167).

—J. BLACKBURN,
Excursions Secretary.

GIFT OF PLATFORM LIGHTS

In the past, there has been delay in manipulating room lights during illustrated lectures, as the switch was some distance from the hall. The Club is very grateful to Mr. H. E. Preston for his gift of two handsome stand lamps for the platform, so that lights can now be controlled without difficulty.

The Victorian Naturalist

Vol. 68—No. 3

JULY 5, 1951

No. 811

PROCEEDINGS

The Annual General Meeting of the Club was held at the National Herbarium on Tuesday, June 12, 1951. The President, Mr. E. E. Lord, presided, and about 80 members attended. The small attendance was attributable to the extremely bad weather.

With regret the President announced the deaths of two well known and honoured members—Mrs. Edith Coleman and Mr. George Lyell, and members stood in silence for a minute as a mark of respect.

The following were elected as members of the Club and welcomed:—Ordinary, Mr. E. D. Gill, Miss F. N. E. MacDonald; Junior, Mr. David F. Keep.

Nomination for membership of Miss Sheila Marjorie Loader, 234 Edinburgh Rd., Castlecrag, Sydney, was received—proposed Rev. H. M. R. Rupp, seconded Mr. J. H. Willis.

ANNUAL REPORT AND BALANCE SHEET

The report of the Council was read by the Secretary, and received on the motion of Mr. Hanks, seconded by Mr. Atkins. Mr. Swaby, on behalf of members, thanked the Council for its work over the past year.

The Treasurer presented the Balance Sheet and financial report. It was moved by Miss Watson and seconded by Miss Young that these be adopted.

The President then spoke on the financial position of the Club, and advised members that a special sub-committee, including one of the incoming Vice-Presidents, Mr. Davidson, and the Auditors, had met and considered in detail what were likely to be the costs of conducting the Club for the ensuing year. As a result of the findings of the sub-committee, he then asked the Secretary to put forward a recommendation for an increase in subscriptions. Mr. Lewis reminded members that the Council, under new regulations, had power to alter subscriptions, but members of Council felt it would be fairer to members to put the facts before the meeting for decision. He moved and Miss Fletcher seconded that the new rates, as printed on the cover of the *Naturalist*, be adopted as from May this year. This was carried unanimously.

The Secretary said that, as a way of economising, a budget of £700 had been allowed for publishing the *Naturalist*. It was also proposed to hold perhaps two natural history nights each year in an endeavour to raise extra money,

Miss Fletcher thanked the Auditors for the work they had done for the Club, also the Assistant Treasurer for her help.

The election of office-bearers for the coming year (as published previously) then took place. No ballot was necessary, as there were just sufficient nominations to fill the positions. (See list on cover of the *Naturalist*.)

Messrs. Hooke and Chalk were elected Auditors on the motion of Mr. Sarovich, seconded by Mr. Hanks.

The President thanked retiring members of Council, Mr. George Hyam and Miss Jean Blackburn, for their work for the Club in past years. He reminded members that Mr. Hyam had been an active member of Council for 21 years.

The President then gave his address on the challenge of conservation to our Club. He was thanked by Mr. R. Davidson.

The Secretary, Mr. F. Lewis, advised that he would be away from Melbourne for the next two months and that Mr. J. Ros Garnet would act as Secretary during his absence.

REPORT FROM SCIENCE CONGRESS

Dr. Chattaway, as one of the delegates of the Club, reported on the recent congress in Brisbane. Various recommendations had been made there which were of direct interest to members; for example, it was recommended that all State Governments be asked to consider the question of preservation of native flora and fauna, particularly rare species. It was also recommended that the States should continue to struggle for Fauna Reserves, and take special note of the methods used by Queensland for control of National Parks. A recommendation, formulated by a N.S.W. member of this Club, concerned the sale of wildflowers in that State—that this should be prohibited by anyone other than licensed nurserymen.

NATURE NOTES

Dr. Wettenhall raised the question of whether rabbits had a preference for certain plants, and asked if any work had been done on this. He also enquired as to what was known of the hibernation of tortoises. The President replied that enquiries should be made from Mr. Ratcliffe of the C.S.I.R.O., who was making a complete survey of the rabbit pest.

EXHIBITS

FUNGI—Earth stars (*Geaster fenestriatus*), and coral fungus (*Clavaria* ? sp.)—Miss Phillips. *Poria purpurea*, found at Sherbrooke Forest.—Mr. A. Brooks.

FLOWERS—Flame heath (*Astroloma conostephioides*); blue tinsel lily (*Calceolaria cyanea*), West Australian form.—Mr. J. Seaton.

SEED POD—Moreton Bay Chestnut (*Castanospermum australe*).—Mr. K. Atkins.

SEVENTY-FIRST ANNUAL REPORT, 1950/51

Your Council has pleasure in submitting the Seventy-first Annual Report for your consideration. Another very successful year has closed with a total of 358 ordinary members and 160 country members, besides honorary, junior, and life members.

At the beginning of the year the Club was honoured by the action of His Excellency the Governor, Sir Dallas Brooks, in granting his patronage to the Club.

Several worthy and well known members have passed away during the year, amongst whom were Dr. C. S. Sutton and Messrs. Charles French, Jr., A. H. E. Mattingley and W. H. Nicholls. These have all played an important part in the Club's history and activities and will be greatly missed.

The subjects presented to the Club at its general meetings were varied and of good interest. Grateful thanks are due to all those, both visitors and members, who helped in this way.

No new legislation has yet eventuated regarding the better control of the national parks of the State, but it is hoped that when the State Development Committee submits its report the Government will see the necessity for doing something practical.

Finance has given your Council a good deal of worry in the past year. Rising costs on every hand have had their effect on the cost of printing the *Naturalist*, and you will see by the Treasurer's report that the Club is little more than solvent. A special sub-committee was therefore appointed to review the financial position carefully. The Council's decisions on their recommendations will be announced tonight.

Mr. B. C. Cotton, an eminent conchologist of Adelaide, was awarded the Natural History Medallion for 1950.

Several changes in important offices of the Club have taken place during the year. Mr. Wilks as Editor and Mr. Preston as Secretary, after several years of excellent service, found it impossible to continue in those positions and your Council, with very much regret, had to accept their resignations. Miss Burton also found it impossible to continue as Assistant Secretary. To all these the Club owes a great debt of gratitude.

The various study groups and sections and the Junior Club at Hawthorn report a more or less successful year. They all give a very cordial invitation to more of the Club members to share in their activities.

The Geology Discussion Group has maintained satisfactory progress, the subjects discussed and the excursions arranged having provided much of interest to those who attended these functions. The purchase for the Library of that great work, *The Geology of the Commonwealth of Australia*, by Sir T. W. Edgeworth David, has proved a great encouragement for the Group.

The Marine Biology Group reports that many interesting excursions were arranged and the Group will, on September 7, enter on

a new research programme. New members are invited for an interesting study.

The Wildflower Garden Section reports a quiet but enthusiastic year. New and old members are reminded of the next meeting on September 6.

The Junior Club at Hawthorn again reports a most successful year. It now enters its eighth year, with 80 members and a high average attendance. The senior Club has had two recruits from the juniors this year. Mrs. Freame is to be congratulated on the continued success of this organization. Thanks are due to the Hawthorn Council for its co-operation and assistance.

Miss Blackburn as Secretary of the Excursions Standing Committee has, with her committee members, again done a splendid job during the year. The Club owes her a great deal for her active help in many ways.

The Native Plants Preservation Group, under the chairmanship of Miss Waddell, has been very active. Local councils and Government departments are constantly being interviewed with a view to having suitable areas preserved before the natural flora has been destroyed, and a great deal of success has attended Miss Waddell's enthusiastic labours.

The National Parks and National Monuments Standing Committee has dealt with a number of important matters, including problems at Mt. Buffalo, the Kulkyn National Forest, Mt. Wellington, and the Lake Tarli Karng region, as well as proposals for the future control of national parks.

The Botany Group still meets regularly, and its meetings are well attended.

The Council acknowledges with thanks gifts to the Library of three books from Mr. T. Bryan, reprints and journals from Dr. Margaret Chattaway, and back numbers of the *Naturalist* from Mr. R. B. Davies.

Your Council is of the opinion that there are a great many talented members of the Club who do not, for various reasons, let their light shine as it should. A few years ago, quite a feature of Club meetings was the period given over to nature notes and questions on natural history subjects. It would add much to the interest of our meetings if this could be revived, and more members come along prepared to contribute some item, no matter how small. The Editor of the Club journal would also be more than grateful for an abundant supply of short pithy paragraphs from members. If we go about with our eyes open, we all must see, from time to time, things that would be of interest to our fellow members. Put them down on paper and send them along to the Editor. She will indeed be grateful.

Apropos of the foregoing remarks, it is interesting to read the following, which is quoted from the Annual Report of sixty-one years ago:

In conclusion your committee would urge upon all members . . . the necessity of doing something, if but a little, for the instruction and interest of their fellow members, as by such encouragement, other members will be spurred on to greater and more lasting work, which will redound to the credit of the F.N.C. of Victoria.

In conclusion, the Council desires to thank all those who have helped in any way during the past year. In particular, thanks are expressed to Mr. Otto of the *Sun News-Pictorial* for organizing advertisements in the *Naturalist*, to Messrs. Chalk and Hook as Auditors, and to Mr. A. W. Jessop, Director of the Botanic Gardens and Government Botanist, for the free use of this fine hall, and for the use of a room for Council meetings. We are also grateful to the Royal Society of Victoria for the use of the lower hall in their rooms in which to store the Club library and as a meeting place for the various study groups.

On behalf of the Council,

(Signed) E. E. Lord, President.

F. Lewis, Secretary.

SUMMARY OF PRESIDENT'S ADDRESS

(Given by Mr. E. E. Lord, June, 1951)

Tonight I want to ask you, fellow members of the F.N.C.V., to take a broad view of this country of ours—as it is today compared with what it was a century and a half ago, and what is likely to be its pattern in the immediate future. Furthermore, what, if any, are your responsibilities and mine, in view of these facts and probabilities.

Some may raise the objection that it is idle to speculate upon what the future holds in store. How can anybody ever imagine what Australia will be like in another 150 years—or even 15? This objection would only be valid if it could be shown that the future was pre-determined and nothing you or I did would alter it. I believe Australia's future is being shaped by two principal factors:

1. How we Australians manage our affairs—from day to day, and year by year.

2. The pressure and influence of the world outside Australia.

The first factor we obviously control; the second can definitely be influenced (though not determined) by the wisdom of our own policy. And to the formulation and carrying out of this policy, you and I make some contribution. Individually, this contribution certainly is small—but collectively it can be considerable. As a Club of 500-600 members, with a tradition of 70 years' achievement behind us, we should not under-estimate that influence: rather we should take every opportunity to properly direct it.

Let us for a moment look at Australia's 150 years' record from the viewpoint of Natural History. Here is some of it: Wholesale forest destruction to clear land for grazing and cropping and for timber supplies; with, until just recently, no thought whatever of

replanting or provision against erosion. Upsetting the balance of life, releasing on the one hand many destructive insects by eliminating bird and other forms of natural control, and on the other hand introducing hundreds of noxious weeds and such pests as the rabbit to complete the destruction. We are short of electric power; short of gas, short of coal, short of water in a dry season. Above all, Australia has one desperate need: population. Vast numbers of migrants must share this country with us and do so quickly. If we do not invite them on a big scale, they will come uninvited—and in your time and mine.

What does all this mean when added up? It means that every bit of country that can possibly be made to produce food, clothing and housing requirements must be opened up.

How are we concerned as field naturalists? As individuals, if we are honest with ourselves, very little. So long as we can get an outing in the bushlands that remain, and collect a bit of whatever we are interested in to add to our own personal knowledge on these things, we are content. What does it matter to us individually if 1000 acres have been leopped off as national parks for tobacco culture; if the Mallee Fowl or a rare *Boronia* have become extinct; if large tracts of Wilson's Promontory and the Grampians are to be subdivided for settlement; alpine grazing rights broadened and every scrap of the Dandenongs opened up for suburban building blocks.

But as a Club we have a very real concern in such matters. And a club is no more than the sum of its members. If we evade or neglect such responsibilities we have no right to be a Naturalists' Club—with objectives such as this one has had since its inception.

Some of these things have been said before, and it is because I feel that they should be the greatest concern of our Club today that I am repeating them. The period of discovery and description of new species is tapering off—for Victoria at any rate—and the period of the great battle for preservation of what natural history remains is rapidly becoming the supremely important duty of every truly Australian organization.

What more can we do? Important work has been done by this Council and its Standing Committees during recent years and all members have given their full support—what more can be done? This Club desperately needs more money to enable it to carry out its work on an adequate scale. Your Council can see all too clearly many of the tasks that should be undertaken. Some of them are far too big for a handful of honorary office-bearers to tackle: they require at least one competent *paid* officer. But who is going to pay his salary—or even a half salary?

The Anthropological Society recently received a sum of £600; bequests like this are needed to give the Club working capital—even with the increased subscription we are only paying our way these days, without broadening the scope of the work.

I would have preferred to talk to you of some of our native trees and shrubs, or of many other things, but felt it to be my duty, as your President, to pass on to you an indication of the Club's future responsibility, with the reminder that this Club, like any other, is no more than what we, its members, make it.

NATIVE PLANTS PRESERVATION GROUP

A Report on the Work to Date

Active members have promoted and, in some cases, assisted in the formation of rabbit-proof wildflower sanctuaries. The following list gives the order in which they were completed, and the body responsible:

Longwood roadside, Country Roads Board; Boulton Wildflower Sanctuary, Tallarook Recreation Reserve Committee; Sydenham Sanctuary for Flowers of the Basalt, Postal Department with Native Plants Preservation Group; two reserves on Great Ocean Road, Country Roads Board; Eumeralla, Mr. Hurst; Anglessea township, Shire of Barrabool; Heather Hill, Shire of Frankston; Springvale Road, City of Nunawading. Definite undertakings, but not completed Tindal's Road, Warrandyte, Shire of Doncaster and Templestowe; Croydon High School site, Department of Education; removal of Pink Spider Orchid, *Caladenia congesta*, from area where a new road will be made to small rabbit-proof enclosure, Shire of Ferntree Gully.

The Group now has the support of local representatives, whose previous work has concrete results—e.g., Mr. W. Hunter will fence the sanctuary near Marlo racecourse, with which the Lands Department has been helpful, and the Shire of Orbst will be responsible for it.

Given reasonable local support, already guaranteed by Taradale Progress Association, the Forests Commission will make two rabbit-proof enclosures near Bendigo, and one near Taradale. These will provide protection for the rare flowers *Phacelia obovatum*, *Crocea exaltata*, *Boronia dentigera*, and *Leucopogon biflorus*.

The Forests Commission has agreed that provision of wildflower sanctuaries is a public service and invited our recommendations. Group members are partly responsible for the motion recently passed by the Country Women's Association urging local attention to preservation. Substantially the same motion was sent in from three country Groups, two being from our members.

Besides members of the F.N.C.V., the Group now has associates, who give active and financial support, and local representatives, who take responsibility for work in their district. There are representatives at Castlemaine, Croydon, Euroa, Gembrook, Marlo, Maryborough, Rushworth, St. Mary's Settlement, Tallarook and Taradale. For the year ending April 30, 1961, there were 37 F.N.C.V. members and 33 associates.

Of a total of £108, £39 has been subscribed by members of this Club, and so far running expenses have been met privately. The present balance in hand, £55, is just sufficient for help definitely promised to Rushworth and the Shire of Lilydale. It will be necessary to help the Borough of Ringwood to fence suitably the East Ringwood property donated by Messrs. Cheong.

Progress largely depends on financial support, and the Group cannot urge trouble and expense unless it is prepared to help, at any rate with the latter. Enclosure of the outstanding survival at Clayton Springs will be expensive. The offer of a reasonable donation must accompany any further representation from the Group. A letter just received from the north-west area expresses interest but refers to the lack of funds.

The position of those who urge the spending of taxpayers' money on preservation would be greatly strengthened if they could show that already a number of people have thought preservation worth money and effort.

Won't YOU help?

WINIFRED WADDELL.

FIELD NATURALISTS CLUB OF VICTORIA

STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED APRIL 30, 1951

GENERAL ACCOUNT

RECEIPTS		PAYMENTS	
Subscriptions—		<i>The Victorian Naturalist</i> —	
Arrears	£64 17 6	Printing	£503 0 0
Current	519 16 7	Illustrating	74 10 0
Life Membership	4 5 0	Despatching	27 7 2
	£588 19 1	Index	12 10 0
Sales of <i>The Victorian Naturalist</i>	8 4 10		£617 7 2
Advertisements in <i>Naturalist</i>	106 5 0	Reprints	4 4 0
Interest received—		Postage	8 14 2
Library Fund	£1 12 6	General Printing and Stationery	30 11 6
Life Members	1 5 6	Library	18 7 0
	2 18 0	Rent, Caretaking and Meetings	24 0 0
Donations received	1 11 0	Donations	1 1 0
	£707 17 11	General Expenses	18 7 0
Excess of Payments over Receipts for year ..	29 17 10	70th Anniversary Meeting—net cost	15 3 5
	£737 15 9		£737 15 9

BUILDING AND CONTINGENCIES ACCOUNT

Balance in Bank at 30/4/50	£119 1 10	Printing of Publications—	
Interest on Investments	35 7 7	Fungi Books	£182 13 9
Sale of Publications	60 16 9	Snake Books	31 5 0
Badges	4 16 0	Bank Charge	0 5 0
Christmas Cards	7 17 0	Transfers to General Bank Account	40 6 0
	£227 19 2		
Bank Overdraft at 30/4/1951	26 10 7		
	£254 9 9		£254 9 9

LIFE MEMBERSHIP ACCOUNT

Balance in Savings Bank at 30/4/50	£59 10 0	Taken into Ordinary Income of year to 30/4/51	£5 10 6
Interest on Current Account	1 5 6	Balance in Savings Bank at 30/4/51	55 5 0
	<u>£60 15 6</u>		<u>£60 15 6</u>

BALANCE SHEET AT APRIL 30, 1951

Building and Contingencies Fund ..	£923 9 5	Bank Current Account—Net Balance	£4 1 2
Dudley Best Library Fund	50 0 0	Arrears of Subscriptions, estimated to realize ..	25 0 0
	<u>£973 9 5</u>	Sundry Debtors	16 10 0
Subscriptions paid in advance—		Stocks on Hand at Valuation—	
Ordinary	£43 5 6	Publications	£192 0 0
Life Membership	55 5 0	Badges	36 0 0
	<u>98 10 6</u>		<u>228 0 0</u>
Excursion Account	60 15 10	Investments—	
Wildflower Protection Group Fund	14 0 0	Dudley Best Library Fund—	
Special Donations in hand	10 10 0	Commonwealth Bonds	£50 0 0
Surplus of Assets over Liabilities	1,038 12 4	Building and Contingencies Fund—	
		Commonwealth Bonds	£950 0 0
		Less E.S. & A.	
		Bank Account	
		overdrawn	26 10 7
			<u>923 9 5</u>
			973 9 5
		Library, Furniture, Epidiascope, Loud Speaker,	
		and Water-colour Paintings, at valuation ..	948 17 6
	<u>£2,195 18 1</u>		<u>£2,195 18 1</u>

Audited and found correct,

A. S. CHALK }

A. G. HOOKE }

Hon. Auditors.

June 12, 1951.

N. FLETCHER, Hon. Treasurer.

EDITH COLEMAN

A Personal Appreciation

There is no need to outline Mrs. Coleman's work in natural history for readers of the *Naturalist*. They, like readers of many other papers, know her writings too well for that to be necessary. In any case, a comprehensive resumé of her work appeared in the *Naturalist* of September, 1950.

But, because she was unable to go out much during the later years of her life she was personally unknown to many members of the Club, and we who knew her feel that we should like to share that knowledge with our fellow-members.

I was almost a school girl when I met her, while she was a recognized expert, and she helped me in many ways, yet she always treated me as an equal, and not as the learner I was. We loved the same things, and that was what mattered to her. I shall always remember her keen interest in all living things, and her enjoyment of beauty. Memory keeps our friends alive for us, and memories of her crowd forward as I write.

I remember my first visit to her Healesville cottage, and how lovingly she showed me its trees; outings when she found orchids that I should never have seen; a day when she drew me into her Blackburn home, saying, "Come in, I want to hear you say 'Oh!'", and showed me a bowl of blue *Lathyrus pubescens* against a cream wall.

It is hard to think of her apart from that Blackburn garden, with its trees and herbs and old roses, its birds among the iuchsiars she had planted for them, its paddock of gums at one side, and its evidences of loving co-operation between mother and daughter everywhere.

Very characteristic of her was a sentence in one of her newspaper articles of perhaps twenty years ago: "It may be only frayed nerves or it may be a very real grief—there are few hurts that do not yield in some measure to the balm of a garden."

I like to remember a walk with her, when, after finding and enjoying many orchids, we stopped at the fence of a little hush garden, watching the Spinebills among its salvia flowers. "Sometimes," she said, "when I see a garden like that I find out who it belongs to, and post them some roots or a packet of seeds. They don't know who sends them, but I like to think of their surprise, and of my seeds growing in so many different gardens."

It is a good memory of a good friend.

JEAN GALBRAITH.

PORTLAND FIELD NATURALISTS CLUB

At the Annual Meeting held on May 9, 1951, Mr. R. Thomson of the High School was elected President, and Messrs. C. Kurtze and B. Virran Vice-Presidents. Mr. B. E. Carthew, Hon. Secretary. Members number 28, and all monthly meetings have been well attended.

Main exhibits of the evening were some of the rare native bees collected recently by Mr. Cliff Beanglehole; several especially good specimens of aboriginal flints found last month in the sand hills by Mr. C. Kurtze; and a two-foot Powerful Owl (*Ninox strenua*), a skin secured by the late Mr. Donovan on the Lower Glenelg many years ago.

NOT F. LEARMONTH.

LIST OF MEMBERS

A new list of members' names and addresses is in preparation. As a guide to Council as to number needed, please notify the Treasurer if you wish to receive a copy.

WINTER VISITORS TO A BLAIRGOWRIE COTTAGE*

By EDITH COLEMAN

Even illness has its compensations, one of them being that one may sit idly in the sunshine to watch the birds without feeling culpable. And that is what I am doing while convalescing at Blairgowrie, three miles on the ocean side of Sorrento. This cottage was built 85 years ago, and here, all down the years, birds have come, sure of water—a precious thing in non-reticulated parts.

Here among tea-tree-covered dunes the strength and variety of the bird population is surprising. Birds that only rarely visit our Blackburn garden (Blue Wrens, White shafted Fantail, etc.) are here in force, while the White-plumed Honeyeater which dominates the home garden we have not seen here.

Watching birds flock to the baths and food tray, one cannot fail to note how some of them differ, in size, colour and song, from their species at Blackburn. Victoria's first naturalist, George Bass, thought the birds of Wilson's Promontory and Western Port had a sweeter note than those of Port Jackson. While I would not say that the Sorrento songs are sweeter, they certainly differ so much that we say, "Oh, listen to that Blackbird, or that Grey Thrush." Both of these birds are larger and more beautiful than those at Blackburn. Indeed, we often think they are superb specimens, in finer leather, the Blackbird with glossier-black plumage and a deeper orange bill, which glows vividly against the black tea-tree. The Grey Thrush, surprisingly large, with a deep nut-brown mantle and light breast, is, one would say, in the pink of condition.

While some birds bathe singly or in pairs, thornbills and many others take the plunge together, and, small as they are, what a splash they make! It is pretty to see two Scarlet Robins in the bath with only their bills and white caps showing above the brim, then the splash as they become active.

Two Goldfinches bathing together are a pretty sight, but a whole "charm" taking the plunge at once is something to watch for—and to listen to, for they sing as they dip.

One moment the bath may be full of a mob of splashing thornbills. Next moment two White-backed Magpies, or a Butcher-bird, have possession and the small birds are discreetly absent. They are not far away, however, for a closely cropped tea-tree nearby offers a ready refuge into which they slip until the coast is clear. In this, 100 small birds are lost at once. A rosemary, and a coastal rice-flower, trimmed in the same way, are used as escapes.

The cottage stands on a high, flat-topped dune, over which a hawk has been seen. Hosts of Blue Wrens are with us, many with blue tails, but so far none with blue body plumage. Recently part

*These notes were the last received from Mrs. Coleman, just two weeks before her death.—Editor.

of the ground at the back was fenced in with wire-netting. This seems to have given a sense of security to the wrens. The enclosure made by wire fence, box-room and garage is probably too restricted for a hawk to "brake down" before making its swoop.

One thing is most impressive about these small winter visitors—their arrival, not in twos or threes, but in flocks. Yellow-tailed Tits come in a cloud, like butterflies. Instantly both baths will be full of splashing tits with hosts waiting in the branches of a black-tea-tree overhead, or along the picket fence.

List of birds that frequent the baths and food tray: Magpie, Grey Thrush, Butcher-bird, Blackbird, Silver-eye, White-shafted Fantail, Yellow Robin, Scarlet Robin, Blue Wren, White-eared Crescent, Spiny-cheeked, Singing and Yellow-faced Honeyeaters, Eastern Spinebill, Thornbill (two species), Scrub Wren, Greenfinch, Goldfinch, Red-browed Finch, Golden Whistler, Red and Little Wattle-birds, Yellow-tailed Tit.

The Leaden Flycatcher does not visit the baths, nor does the Mountain Thrush, but it builds here. The British Song Thrush has apparently not spread in this direction.

DISCOVERY

The other day we were reorganizing a garden shed, and there was much going and coming through the doorway, when something close against the lintel caught my eye, and I stopped to investigate. At first I thought it was a Hairy-Mary cocoon—just about that size—1½ inches, but then I noticed that, instead of a red-brown colour, it was mouse-coloured. I peered again, then called my companion to have a look. Was it a bat? "Probably," said she. "Leave it alone, revolting thing." But not for me. I have often heard them here at night, but I had never seen one of this minute dimension, my only other experience with the species being with the huge fellows that abounded with us in Ceylon. I'll agree, seen hanging up, they did look revolting. My partner refused to help in my education, so very gingerly I tried to ease it away from the door jamb and into a glass jar, as I did not know if it would take fright and fly off. The poor wee thing squealed heartily and clung to my glove. When I saw it wouldn't fly off, I took it out and really began to enjoy myself.

The fur—I wonder could anything else be so silky and soft. It was so soft that when I stroked the tiny body with my little finger it could not realize the subtlety of the texture. Then the gradation of colour from the grey-brown of the body to the deep grey-purple of its wings, tightly folded on each side. But its tiny face—at last I have seen a fairy pig and know that pigs *do* fly! I don't know when I have been so fascinated—the minute upturned snout, tiny face and, by comparison, long ears shaped rather like a conch shell cut in half, with the inner convolutions showing. What an extraordinary formation! By this time my poor little bat was vibrating all over at a terrific rate and I did not want to frighten him further, so I tucked him away in a dark spot where he would get over the shock of being so rudely disturbed and stared upon. And I still don't know half the things I wanted to know about him.

(Extract from a letter sent to Mrs. Coleman.)

SOME REVISION IN HELICHRYSUM

(With Descriptions of Four New Species)

By N. A. WAKEFIELD

HELICHRYSUM ALPINUM, sp. nov.

Frutex alpinus, foliis oblongis obtusis margine subrevolutis supra glabrescentibus subtus ramulisque albo-tomentosis, corymbis confertis, capitulis angusto-cylindricis circa 4-floribus, involucri squamis externis nitidis phytocis intimis appendice obtusa patente, pappi setis apice vix crassatis.

HOLOTYPE: Mt. Hotham, Victoria, Jan., 1888—C. Walter. (Melb.)

An alpine shrub; leaves very small, oblong, obtuse, margins more or less revolute, upper surfaces glabrous, white-tomentose beneath; corymbs very small, with narrow-cylindrical sessile heads; florets usually 4 (rarely 5 or 6); outer involucrel bracts shining, light brown to reddish; inner bracts with blunt white spreading apices; pappus bristles not or slightly thickened at their apices.

Plentiful in the high alps of Victoria, New South Wales and Tasmania.

The Tasmanian specimens constitute the *Helichrysum Hookeri* var. *expansifolium* Morris and Willis (*Vic. Nat.*, 59: 85-6, Sept., 1942), which is very pubescent with rather acute broad-based leaves. In the Kosciusko area of New South Wales the species is very pubescent and has foliage with intermediate characters.

H. alpinum is best distinguished from *H. Hookeri* in having spreading leaves, and from *H. Backhousei* (a Tasmanian endemic with about 15 florets) in having very few florets.

HELICHRYSUM ANGUSTUM sp. nov.

Frutex ortivus, foliis obovatis planiusculis submucronatis supra glabris subtus ramulisque adpresso-tomentosis, corymbis confertis, capitulis sessilibus angusto-cylindricis circa 6-floribus, involucri squamis externis stramineis intimis appendice subacuta patente, pappi setis valde crassatis.

HOLOTYPE: Swanport, Tasmania, ca. 1880—Dr. G. F. Story. (Melb.)

A coastal shrub, up to 10 feet high; leaves under $\frac{1}{2}$ inch long, obovate, almost mucronate, flat; glabrous above, with tightly appressed tomentum beneath; corymbs small, dense; heads narrow, sessile, about 6-flowered, outer bracts dull, light brown; inner bracts with spreading, somewhat pointed, white apices; pappus bristles very much thickened at their apices.

It is apparently confined to the east coast of Tasmania.

H. angustum is at once distinguished from *H. Backhousei* by its maritime habitat, thin leaves, narrow heads and few florets, and it differs from the mainland *H. cuneifolium* in having less tomentum, smaller obovate leaves, flat pointed bract-rays, etc.

HELICHRYSUM SECUNDIFLORUM sp. nov.

Frutex conditus, foliis angusto-cuneatis obtusis supra arachnoideis subtus ramulisque cinereo-tomentosis, corymbis subcompositis saepius secundis, capitulis campanulatis circa 15-floribus, involucri squamis externis nitidis phytocis intimis appendice plana oblonga patente, pappi setis apice crassatis.

HOLOTYPE: Cobbaras Mts. (6000 ft.), Victoria, Feb., 1854—F. Mueller. (Melb.)

Spreading shrub with very spicy aroma; branchlets white-tomentose; leaves narrow-cuneate, flat, 1 cm or less long, grey and cobwebby above, densely white-tomentose beneath; corymbs small, rather dense, often secund in the main branches; heads about 15-flowered; involucre campanulate;

outer involucrel bracts shining, brown; 'inner' bracts with long flat blunt spreading white apices; pappus bristles thickened at their apices.

Almost wholly from the Australian Alps, of New South Wales and Victoria; but also from Jenolan Caves and Wilson's Promontory.

Included with *H. thysoides* by Morris and Willis (l.c. 86). but easiest distinguished therefrom by short broad leaves and dense white tomentum. Its shining involucrel bracts and cuneate leaves distinguish it from *H. ledifolium*—a Tasmanian endemic; and these two features, as well as the flat smooth characters of the foliage, distinguish *H. secundiflorum* from *H. rosularisifolium*.

HELICHRYSUM CONDITUM, sp. nov.

Frutex conditus, foliis angusto-lanceolatis planiusculis acutis supra anarchoideis vel glabrescentibus subtus ramulisque albo-vel ferrugineo-tomentosis, corymbis decompositis, capitulis pedicellatis subturbigatis circa 16-floribus, involucri squamis externis duriusculis imbricatis intus appendice filia subaequali patente, pappi setis apice crassatis.

HOLOTYPE: Pine Hill, Suggan Buggan, Victoria (on sandy slopes, Jan. 16, 1948—J. H. Willis. (Melb))

A shrub about 8 feet high, somewhat viscid and with a spicy aroma; branchlets densely white-tomentose, leaves narrow-lanceolate, $\frac{1}{2}$ to 1 inch long by $\frac{1}{16}$ to $\frac{1}{8}$ inch wide, acute, rather flat, cobwebby to glabrous above, usually ferruginous beneath; corymbis usually large, decomposed; heads rather turbinate, each with about 16 florets; outer involucrel bracts unique in the group, hard, with whitish apices; inner bracts with broad, rather pointed, spreading white apices; pappus bristles thickened at their apices.

Distributed in the drier parts of south-east New South Wales and eastern Victoria.

Superficially *H. conditum* resembles *H. thysoides*, but is distinguished at once by dense tomentum and pointed involucrel bracts.

HELICHRYSUM DENDROIDEUM, nom. nov.

[Synonym: *Eupatorium ferrugineum* Labill., Pl. N. Holl., 2: 38. t. 180 (1806).]

The name *Helichrysum ferrugineum* (Labill.) Less., Syn. Comp., 317 (1832), cannot stand for this species, as the combination had already been used by Persoon in 1807 (Syn. Plant., 2: 414) for a South African plant.

A tall shrub or small tree, branchlets conspicuously angled, only very slightly tomentose, leaves lanceolate, usually acute, margins usually crenulate; corymbis large, loose, heads pale, narrow, with 5-6 (rarely 4-8) florets; bract rays short, broad, crenate.

Common in eastern New South Wales, Victoria and Tasmania, and reaches South Australia.

HELICHRYSUM ARGOPHYLLUM (A. Cunn. ex DC.) comb. nov.

[Synonym: *Cassinia argophylla* A. Cunn. ex DC., Prod. 6: 155 (1837).]

A diffuse coumarin-scented shrub, up to about 5 feet high; branches densely brown-tomentose; leaves narrow-lanceolate, to about 5 cms. long and 1 cm. broad, flat, thin, glabrous above, tightly grey- to rusty-tomentose and often 3-ribbed beneath; corymbis very large, somewhat loose; heads broad, stalked, about 14-flowered; outer bracts dull, brown, papery, inner bracts with very broad short rounded crenulate white apices; pappus bristles somewhat thickened at their apices.

Plentiful, especially near the coast, in south-eastern New South Wales, eastern Victoria, Bass Strait islands, and northern Tasmania.

Syn. *Helichrysum ferrugineum* var. *gravesii* (Rodway) J. H. Willis, Vic. Nat., 58: 164 (April, 1942).

H. orgophyllum is amply distinguished from *H. dendroideum* by its dense tomentum, flat leaf-margins, broad catipulae and numerous florets. It is related to the sub-alpine *H. Stirlingii*, which is much larger in all parts, and invariably has long flat spreading white bract-rays, as well as having a different leaf-venation—a feature not apparent in small leaves.

HELICHRYSUM ROSMARINIFOLIUM (Labill.) Less., has been at times lumped with *H. thyrsoides* and *H. ledifolium* (Syn. *Osothamnus crispifolius*) from both of which it is readily distinguished by its unique asperous or tuberculate rolled mucronate leaves and few (about 6) florets. (*Osothamnus purpurascens* DC. is a synonym of *H. ledifolium*, and is thus quite distinct from *H. rosmarinifolium* despite the implications in connection with the setting up of *H. rosmarinifolium* var. *purpurascens* Morris and Willis, l.c., 59: 86-8.)

HELICHRYSUM GUNNII (Hk.f.) F. Muell. ex Benth.

This name must be used for the Australian species which has long been known as "*H. cinereum*". The type specimen of the latter—i.e., of *Chrysocoma cinerea* Labill.—though allegedly from Tasmania, is undoubtedly the New Caledonian endemic which Schlechter later described as *H. neocaledonicum*. Labillardiere did collect the present *H. Gunnii* in Tasmania, but included the specimens in his herbarium with his *Helichrysum* (*Eupatorium*) *rosmarinifolium*.

H. Gunnii is abundant on the coastal sand-dunes of Tasmania and Victoria, and reaches South Australia.

From the characters given, *H. bracteolatum* (Hk.f.) Benth. seems to be a slightly larger-leaved variation of *H. Gunnii*.

HELICHRYSUM BILOBUM, nom. nov.

[Synonym: *Osothamnus retusus* Sond. et Muell., *Linnaea* 25: 510 (1852).]

Mueller's name "*Helichrysum retusum*"—*Frag.*, 8: 46 (1873)—cannot be used for this plant, for the combination had already been made by Sprengel in 1826 (*Syst.*, 3: 471), based upon a different plant.

The new name alludes to the normal bilobed state of the apex of the leaf.

H. bilobum is found in western Victoria, south-west New South Wales, and South Australia.

HELICHRYSUM CATADROMUM, nom. nov.

[Synonym: *Osothamnus decurrens* F. Muell., *Trans. Phil. Inst. Vict.* 3: 59 (1857).]

Mueller later combined this specific epithet with *Helichrysum*—*Frag.*, 8: 46 (1873); but that combination had already been used in 1794 (Moenck, *Meth.*, 576) for a different plant.

The new name is the Greek equivalent of Mueller's Latin epithet, *decurrens*.

H. catadromum has sparse thick almost pointed terete leaves not dilated or bilobed, and very much swollen decurrent lines on the stems, and it is certainly distinct from *H. bilobum*, which has flat and dilated or else conspicuously bilobed leaves, and only very thin lines on the stems.

H. catadromum is a desert species, found in the interior of New South Wales and South Australia. It reaches Western Australia too, and has recently been discovered in north-western Victoria (at Jeparit and Hattah).

Helichrysum pseudo-ferrugineum Hochr. referred to by Willis, l.c. 58: 163-4, is, according to the piece of the type specimen which the author sent to Melbourne, identical with *Cassinia aculeata* R.Br.

The publication of this paper in its present form, is for the purpose of making the several new names available for use in several forthcoming

botanical works. The writer has completed a survey of the 30-odd species which constitute the section *Ozothamnus* of the genus *Helichrysum*, and it intended that such will eventually be published fully.

In the carrying out of these studies, many hundreds of specimens have been examined—from Melbourne and Sydney National Herbaria, Hobart University, and various private collections. Neither there nor in extensive field observation did the writer find evidence of any transitional forms, as are sometimes attributed to the group; but on the contrary, it was revealed that the species are quite stable in their respective combinations of distinguishing features.

"FLINDERS CHASE, KANGAROO ISLAND, SOUTH AUSTRALIA"

(By Mervin Masterman)

In fourteen all-in-one chapters the author records her impressions of the delights and attractions one may find in Flinders Chase—the almost ideal 212 square mile wild-life refuge which occupies the entire western end of Kangaroo Island. Into this sanctuary have been introduced such animals as the koala, platypus, emu, Brush Turkey and Lomian, several species of kangaroo and wallaby, and, oddly enough, pigs, goats and Ligurian bees.

In justice to the South Australian Flora and Fauna Board, which manages the sanctuary, it should be noted that the last-mentioned three are a relic of the early days of settlement and exploration. In common with reserves of similar kind in other parts of Australia, financial limitations have hindered any attempt by the Board of Management to weed out the pigs and goats, although, as is indicated toward the end of the book, some revenue is obtained from the sale of possum and wallaby skins!

The bees, however, provide quite another—and much more picturesque—story, and to them the reader should be grateful, for without them there would have been, perchance, no little book by Mrs. Masterman.

In its 62 pages (Georgian House, Melbourne, 7/6) will be found a fund of accurate information, gleaned from field observation, about the character and habits of the bush creatures that inhabit the Chase. The Masterman family—camped for long spells near the bank of the Rocky River—found the animals a sociable, even sometimes inquisitive, bunch. The pen pictures of "Maria," the Sooty Kangaroo, and her joey "Jimmy," the Lace Lizard and his gastronomic feats, the koalas and their private lives provide material for but a few of the happily written pages of the book, while the many pencil drawings on the margins and sandwiched among the text are a pleasing embellishment. On page 4 one will surely smile to observe the elegant attitude assumed by Mrs. *Phascolarctus cinereus* when overcome by the heat of the day!

The Chase is rich in bird-life and the author tells just enough about them to whet the appetite of the bird observer for studying birds of a kind rare on the mainland. As a complement to the animal life, she writes in a general way of the various plant associations that occur throughout the area, and a number of the more showy wild-flowers are not only described but illustrated by four colour plates from her own paintings—two of them portraying some of the Island's orchid flora. The plates, although colourful, rather misrepresent the natural colour-tones of the flowers depicted, but this is a fault that is easily forgiven in a book that is so handsomely produced. It may not become the natural history classic predicted by its publishers, but it is a book worth reading and worth possessing for it merits a place in one's bookshelves among a collection of Australianiana.

—J.R.G.

GEORGE LYELL, 1866-1951

The death of George Lyell, F.E.S., at his home at Gisborne, Victoria, on May 19, 1951, has broken yet another link with the early history of the Field Naturalists Club of Victoria, of which, since 1940, he had been an Honorary Member. It also removes possibly the last survivor of the older entomologists from the State of Victoria, in fact almost of Australia. Of Mr. Lyell's generation of entomologists, perhaps the only one still living is Mr. H. Lawson Whitlock, of Bunbury, W.A.

Mr. Lyell joined the Club in 1888 as a young man of 21 and soon came under the influence of many of the pioneers of Australian natural history—Frank Spry, then entomologist of the National Museum of Victoria, Sir Baldwin Spencer, Charles French, James Kershaw, Dudley Best, all within the State of Victoria, and he corresponded and exchanged specimens with such notable entomologists as Dr. G. A. Waterhouse, Dr. Jefferis Turner, Mr. Rowland Illidge, F. P. Dodd, and W. B. Barnard.

In addition to becoming known as one of Australia's leading Lepidopterists, he also came under the spell of our native orchid flora.

Soon after joining the Club he moved from South Melbourne to the quiet and picturesque little township of Gisborne, where he was associated, almost until the time of his death, with the firm of Cherry & Sons—a name known in every dairying community which had use for a butter-churn, and to every entomologist throughout the length and breadth of Australia, for Cherry & Sons were suppliers of all entomological requisites from pins to cabinets!

Every nook and cranny in the northern end of the Pyrene Ranges and Mt. Macedon soon became known to George Lyell, and it was not long before he collected the rare "Spectral Duck Orchid" (*Calceola Sullivani*), specimens of which he exhibited at a Club meeting in January, 1906. Its discovery there has intrigued orchidologists in later years because never before or since has it been found beyond its original station in the Grampians, where it was first discovered by Sullivan in 1889.

In 1929, in company with the late W. H. Nicholls, of orchid fame, George Lyell came upon a second plant curiosity—the Elbow Orchid (*Spiculaea Huntiana*). At that time it was regarded as a very rare species in Victoria; more recent records, however, have shown it to be relatively widespread.

His collection of pressed orchids included specimens from all parts of Australia, and his careful annotations provide a valuable record over the past sixty years of species distribution, at any rate for the State of Victoria.

The finding of several rare and very local species of Lycaenid butterflies in the Gisborne district is another of George Lyell's achievements. One species (*Pseudalmonus chlorinda zephyrus*) he discovered on a wattle tree in the main street of Gisborne. That tree has long since gone and with it the butterfly.

A courteous man and a prompt and kindly correspondent, his readiness to help others was inevitably reflected in the eagerness of others to reciprocate. George Lyell thus maintained a wide circle of friends in all States of the Commonwealth—many of these he never met, though he corresponded with them for the greater part of a life-time!

In the early years of his long association with the Club, he frequently exhibited at the Annual Conversaciones, and contributed papers and notes—mainly on Lepidoptera—to the *Victorian Naturalist*. Between the years 1890 and 1909 eleven of his contributions concerned his reports on new species of moths and butterflies. His last note, written in 1933, brought to notice the curious phenomenon of "shock" movements in the flowers of certain orchids.

Amongst entomologists his fame will for ever rest on his two great contributions to the study of Australian Lepidoptera—first in 1914, the publication of the standard text book, *Butterflies of Australia*—in the

production of which he collaborated with the late Dr. G. A. Waterhouse of Sydney (who predeceased him by less than a year); and second by the magnificent gift, spread over the years 1932-1947, to the National Museum of Victoria, of his collection of over 40,000 specimens of moths and butterflies. Besides being scientifically and accurately named, this collection is an everlasting monument to the neatness and skill of its donor. It contains upwards of 400 type specimens and many rare aberrations, as well as long series of specimens of many species.

George Lyell was a genial and likeable man and an excellent companion on a ramble. As with many naturalists who pursue their hobbies out of doors, he remained able and active up to an age when most other men prefer to sit quietly at the fireside. Those of us who have journeyed to Gisborne, have on such occasions looked forward to the five-mile tramp to the Pyrete Ranges, where perchance we might be guided to inspect a particular tree amongst thousands of other seemingly identical ones, on which he had some moth or butterfly larvae feeding.

He once pointed out that, as a concession to his age at 65—when he suffered a serious illness—he had given up night collecting. This meant that he had abandoned his earlier practice of roaming the thick forests or lonely ranges at night, armed with collecting gear and lamp.

At 80 he was still active enough to enjoy a ramble of several miles or a trip to Melbourne to visit the National Museum: by 1950, however, he realized that his field days were over.

His collection of herbarium specimens of orchids is to go to the National Herbarium, where it will constitute—like his Lepidoptera collection at the National Museum—a perpetual monument to his work and memory. He has added much to the annals of Australia's natural history. This he blended happily over the years with keen business ability, his home, and his devotion to the Presbyterian Church, as well as his patronage to local organizations in Gisborne.

—J. ROS GARNER and A. N. BURNS.

BIRDS AT SYDENHAM SANCTUARY

The small sanctuary at the P.M.G.'s Department Wireless Station, Sydenham, enclosed for the purpose of preserving typical basalt flora of the Kerlor Plains, is found to possess some appeal to the bird lover.

On Saturday, March 10, 1951, just outside the sanctuary, a White-faced Heron was disturbed from a shallow pool. A few seconds later two more birds of the same species arose in laboured flight from the little gate of the fenced-in area. Swarms of large grasshoppers presumably accounted for the birds' presence. On the walk from St. Albans in the dazzling summer sunshine, numbers of White-backed Magpies, many Ravens and a Nankeen Kestrel, were sighted. On the return walk later in the day, bird twitterings in a stunted Pepper-tree on investigation were found to be from White-fronted Chats and Yellow-tailed Thornbills, in equal numbers totalling about 30 birds. The birds darted to and from the Pepper-tree and the telegraph or fence wires of the railway line. The tree was in flower, but what kept the birds together so consistently could not be ascertained. An adjacent Sugar Gum revealed a Magpie Lark perched overhead a few feet from its mate, who was brooding on a mud nest built on a branch well sheltered with dense foliage. Last year Pipits were observed in the P.M.G.'s paddock, and Quail, a Brown Hawk, and several Honeyeaters (principally the White-plumed species) have been reliably reported in the immediate locality of the enclosure.

—H. C. E. STEWART.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, July 9, 1951. The President, Mr. E. E. Lord, was in the chair and about 120 members and friends attended.

Mrs. Marjory Loader, of N.S.W., was elected and welcomed as a Country Member.

The President announced the nomination of Mr. Geo. N. Hyatt as an Honorary Member in recognition of his long and valued service to the Club (Mr. Garnet/Dr. Chattaway).

A cordial welcome was extended to visitors present, especially to Mr. and Mrs. S. Colliver. Mr. Colliver brought greetings from the Queensland Naturalists' Club (of which he is President), Mr. Geo. Mack, Mr. A. H. Chisholm, of Sydney, and spoke of his recent meeting with Dr. Flecker at the Science Congress held in Brisbane.

Mr. Garnet reported the appointment of Mr. A. C. Collins (a Country Member of the Club) to the Town and Country Planning Board. It was recalled that Mr. Collins and his Associates had, in 1950, sought the advice of the F.N.C.V. on the inclusion of nature reserves and wild-life sanctuaries in the planning of the Greater Geelong area.

A brief report on his recent visit with members of the State Development Committee to Portland and the Lower Glenelg area was given by Mr. Garnet, who stated that the visitors had been most impressed with what they had seen and with the potentialities of the region as a National Park.

On behalf of the Wild Flower Preservation Group, Mr. Swaby made an earnest appeal to members of the Club for financial support and assistance in the care and upkeep of these reserves. Due to Miss Waddell's consistent work and generosity over a long period, protection for many species of flora fast becoming rare has been procured. This important work must receive immediate support otherwise the efforts of this Group will be in vain. Miss Waddell wishes to hear from anyone knowing the locality of Providence Ponds and the name of any person in this district who would form a Group for the care of a sanctuary.

The President introduced paragraph 6 of the proposed by-laws dealing with the proposal to impose an entrance fee. A pro and contra statement was presented by the Acting Secretary, Mr. Garnet. The Chairman invited comments before requesting members to indicate their approval or disapproval of the adoption of

this fee. Messrs. Coghill, Burston and Swaby spoke on the merits and demerits of the proposal and a vote, by show of hands, indicated a fairly even division of opinion on the question. Mr. Swaby drew attention to the desirability of exempting Junior Members from such a charge.

Mr. C. E. Bryant, of the R.A.O.U., and Editor of *The Emu*, was the guest speaker of the evening and chose for his subject "Camps of the R.A.O.U." The Union was founded in 1901 in Victoria mainly by members of the F.N.C.V., and in recognition of its jubilee Mr. Bryant gave a vivid account of the many interesting and amusing experiences encountered at camps held in various parts of Australia. His descriptions were accompanied by splendid slides depicting some of the actual camp sites, the district surrounding the camps and many of the birds observed on these expeditions.

A vote of thanks was moved by Mr. Hanks and seconded by Dr. Chattaway.

EXHIBITS

FLOWERS—Various species, all garden grown, and exhibited by Mr. I. Hammett, Mr. A. E. Brooks, Mr. R. Allen, Mr. J. S. Seaton and the Botanic Gardens.

Pat. of Native Orchids—Master David Blomfield.

CATERPILLAR—Larva of Swift Moth (see note)—Mr. J. Ros Garnet.

SPIDER—Huntsman Spider from Orpheus Is., Queensl.—J. Mollison.

ARTEFACT—Quartzite Quorn, found at Keilor, flaked for scrapers. Oldest authentic record of stone worked by the aborigines.—Mr. A. Brunton.

PHOTOGRAPHS—Various Fungi found on excursion to Menzies Creek, including the Vegetable Caterpillar, *Cordyceps Gunii*.—Mr. R. D. Lee.

SWIFT MOTH CATERpillARS

An Economic Pest

These caterpillars (family *Hepialidae*), at present in plague proportions, are infesting and temporarily destroying vast areas of valuable pasture in the Western District of Victoria.

The larvae feed almost entirely on grass roots and, during the course of their development in autumn and winter, they succeed in completely destroying the herbage in areas covering several acres. As seen from a distance infested paddocks present the appearance of having been ploughed and harrowed.

Extensive areas between Port Fairy, Portland and Hamilton have been temporarily ruined by the depredations of the caterpillar, which during daytime, is to be found several inches below the surface and therefore immune from attack by birds.

Control by chemical poisons appears to be out of the question both on account of expense and danger to live stock. Biological control seems to be the only solution and it is understood that the C.S.I.R.O. is at present studying the biology of the moth and its larvae. Fungus infection may be practicable.

In its present number it occasions severe economic loss to the unfortunate grazier on whose property it happens to feed, since, as the grass disappears, sheep must either be sold or transported to fresh fields.

—J. ROS GARNET.

THE MALLEE

(Lecture given at Club, August 1950)

By DR. REUBEN T. PATTON

The word Mallee is used in two separate senses. First it is employed for those eucalypts which have a large rootstock from which several rather slender shoots arise, and, secondly, it indicates that portion of the State in which these eucalypts occur. However, within this area, which is roughly one-fifth of Victoria, there are other types of vegetation, in which no eucalypts may be found or be only sparsely present. Geographically, the Mallee is an area of very low relief and has no streams either arising in, or running through it. Excepting in part for the fringing forest of Red Gum-Black Box along the River Murray, this portion of the State is dominated by two elements of its climate, low rainfall and high temperatures, and arising from these two is high evaporation, which at Mildura amounts to over sixty inches from a free water surface.

The rainfall decreases from approximately fifteen inches in the south to ten at the corner of the State where it adjoins New South Wales and South Australia. Not only is the total amount of rain received small, but both its distribution over the year and its degree of variability add further difficult conditions for plant life. In the north at Merbein, only three months of the year have a rainfall over one inch per month, and even in the south at Rainbow there are four months with less than an inch. No station in the Mallee has a total exceeding two inches for a single month. The monthly distribution of the rain is a modified winter type, that is, the winter months receive more rain than the summer months and there is therefore a constantly recurring annual dry period. However, the most unfavourable factor of climate for plant life is the unreliability of the rainfall. Drought years are not evenly distributed with the good years but may be grouped together as in the years 1943-5. Apart from this there has been a cycle for the bad years, for every thirteenth year since 1875 has had a very low rainfall; but the amount received is not always the lowest received in any one year during a cycle. The years 1888, 1901, 1914, 1927 and 1940 were also dry in the Wimmera and even as far as Bendigo.

Temperatures throughout the Mallee are high in summer and the century is passed several times in the year. The maximum temperature recorded is 123.5 for Mildura. Although summer temperatures are high, the mean minimum temperatures in winter are low, much lower indeed than those of the coastal towns Portland and Warrnambool. This explains why the flowering of the Harbinger of Spring is frequently recorded first from the coastal areas.

Although climate dominates the whole area, there is by no means any uniformity in the vegetation, for indeed there are several very strongly contrasting types, and this is due entirely to the very

different soils present, which in turn are the result of different geological agencies.

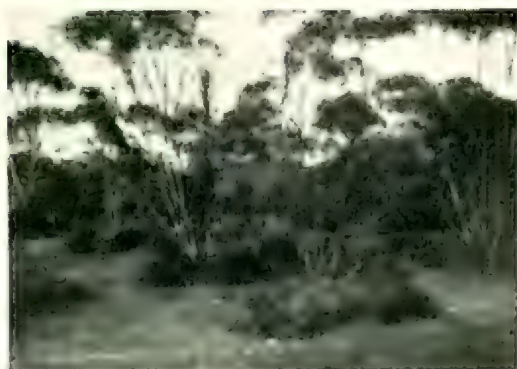
In Miocene times, the present site of the Mallee was occupied by a wide gulf extending beyond the present State boundaries, and into this the Darling, Murrumbidgee and Murray Rivers entered separately. Subsequently, on the recession of the sea, the sea bed became dry land, and the well known east and west ridges were formed, but there is comparatively flat land as well. Shell life in those geological periods was richer than to-day, and as a result the newly formed surface was highly calcareous. During subsequent periods rain water washed down the lime to lower levels and thus was formed the present calcareous deposits beneath the soil. In places sheet limestone occurs but in others only a loose rubble is found. This limestone country is the especial home of the Mallee eucalypts.

A later period was arid and during this time red sands were blown from the north to form the reddish ridges which have a southerly or south-easterly direction. The soil on the ridges, particularly in the north, is very deep and lime may be entirely absent. In some parts, however, lime does occur at shallow depth, and it seems probable that the red sand became mixed with loose lime during the arid period. The ridges are at times very broad and flat and are the home of the Pine-Belar forests.

Still later, and not far distant from the present time, another arid period occurred during which white sands were blown from the south-west and moved in a north-easterly direction, reaching possibly as far as Yungera. These sands occupy large areas in the Big Desert, which lies south of the Ouyen-Murrayville line, and in the Millewa Desert, which lies to the north of the line. The Hattah Sandhills are an extension of this area, but here the sand has assumed a reddish tint due to intermixture with the red sands from the north. These white sands at times form long ridges but without general direction, at other times an irregular collection of hills, termed "jumble" by the late A. S. Kenyon, and sometimes sand-sheets, but these are not well developed in Victoria. Although these sands have been stabilized by vegetation the soil shows no profile. This sand is clothed by the Mallee Heath.

The final dry, or more or less arid, period for the Mallee brings us to the present day and we can witness the last stages of the drying up of the numerous lakes scattered about this country and near by areas. Some of these have been completely soiled over and vegetated, as may be seen on the Calder Highway between the 307 and 309-mile posts and also on the Henty Highway at Bronzewing. One cannot say whether the present dry period is deepening or ameliorating but the drought of 1943-5 was the worst experienced by vegetation and therefore suggests the former. The widespread destruction of native pine nearly amounted to the wiping out of a

PLATE I



Typical Mallee eucalypts on limestone outcrop

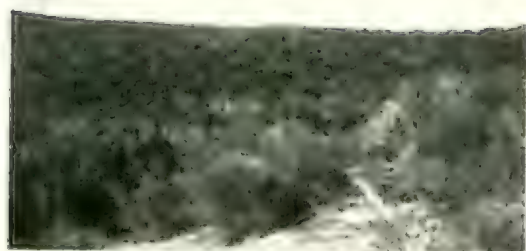


Pine-Myrtle forest



Mixed Pine-Bell forest with understorey of small trees

PLATE II



Marine Heath



High sandhill at Mal-
den, heavily silted
thicket with *Cassia*
acutrochaeta.



Sand dune with *J.*
acutrochaeta and *Tru-*
ella *diversa*.

species in a given area, an event of unusual interest. Many other species were also seriously affected and a slight intensification of such a drought could cause a calamity.

Beneath the floor of these lakes are large deposits of gypsum, and the abundance of this suggests a continuous supply of sulphur for the production of this mineral: this in turn suggests a supply of water to the lakes. In places, instead of crystals, white powdered calcium sulphate occurs, known locally as *copi*. This can carry a sparse vegetation, chiefly species of *Chenopodeaceae*.

As these lakes were salt, this factor has an important bearing on the vegetation that comes in after the lake bottom is soiled over, for the plants have not only to endure the adversities of climate, but the adverse effects of salt in the soil. The composition of the vegetation is not stabilized and a change is proceeding from salt marsh to salt bush plain.

PLANT ASSOCIATIONS

The best known type of vegetation in the Mallee is the Mallee eucalypt association on the limestone country. This is definitely a scrub community with the spreading crowns of the plants meeting, or nearly so, overhead but the rootstocks are far apart. The several shoots which arise from the rootstock come out at various angles, usually not greater than 45 degrees, and this naturally gives a very spreading crown. As the foliage is sparse, a large amount of sunlight passes through the crown to the ground, which is frequently quite bare. There is, however, an understory of shrubs, but its development is governed by the density of the eucalypts, of which there are several species, *E. calycogona*, *E. gracilis*, *E. oleosu* and to a lesser extent *E. viridis*. In the southern Mallee, now well cleared, *E. dumosa* appears to have been dominant over a wide area and to have overlapped the present marked boundary of the Wimmera, as for instance this species occurred south of Warracknabeal. Both *E. dumosa* and *E. incrassata* are also associated with the other species in the north but they are to be found more on the sandy areas.

Near Pine-Belar areas, other trees from this association are mixed with the eucalypts but this is not a usual feature. Species of *Acacia* are found in the discontinuous shrub layer and among these are *A. brachybotrya*, *A. calamifolia*, *A. ligulata*, *A. microcarpa* and *A. sclerophylla*. Both species of *Cassia* are also present but not abundantly. These are *C. cremophila* and *C. sturtii* and both are very handsome shrubs when in flower. Other shrubs present are *Bertya mitchellii*, *Beyeria opaca*, *Dodonaea burserifolia*, *D. stenogyne*, *Eremophila glabra*, *E. maculata*, *Exocarpus spartea*, *Grevillea huegelii*, *Olearia muelleri*, and *O. pineleoides*. The under-shrubs are equally sparsely distributed and among these the most striking is *Trichinanthus exaltatum* with its large bushy pinkish-mauve inflorescence. Conspicuous by their light pale bluish-grey appear-

ance are *Enchylaena tomentosa* and *Rhagodia gaudichaudiana*, both belonging to *Chenopodiaceae*. Small members of this family together with species of *Zygophyllum* are fairly plentiful but appear to have been very strongly developed in the southern Mallee. Small annuals are numerous but the degree of development in any one year depends on the particular season.

THE PINE-BELAR ASSOCIATION

This association is of the greatest interest because of the fact that a forest can exist in so low a rainfall, particularly in the 10-11 inch area. Sometimes these two trees form mixed forest and have as an understory a large number of other trees, *Eremophila oppositifolia*, *Exocarpus aphylla*, *Fusanus acuminatus*, *Hakea leucoptera*, *Heterodendron oleifolium*, *Myoporum platycarpum* and *Pittosporum phillyraeoides*. At other times, each of the dominants forms a forest by itself, but generally the pine is on the highest sandiest red soil, while belar seeks the heavier lower elevations. The development of the shrub layer is very irregular and does not appear to be wholly controlled by the density of the crown canopy. Among the most interesting are the very spinescent *Acacia colletioides* and *Scaevola spinescens*, the former being very conspicuous when covered with the very bright flowers of *Loranthus preissii*. *Olearia pinuleoides*, which as the species' name implies is extremely like some species of *Pinalea*, is very striking when in bloom. Both species of *Cassia* are present and are very attractive. The number of species of annuals is not great, as is commonly the case in forests, but the floor of a pure pine forest is most attractive in a good year when carpeted with masses of small annuals, mostly species of *Compositae*.

MALLEE HEATH ASSOCIATION

The vegetation of the sandhills has a connection with the heath of the coastal areas for here also occur *Aotus villosa*, *Hibbertia stricta* and *Olearia ramulosa*. The family *Epacridaceae* is also well represented, but is not found in other Mallee associations, and the following species are present, *Astroloma conostephioides*, *A. pini-folius*, *Brachyloma daphnoides*, *B. ericoides*, *Leucopogon cordifolius* and *Lissanthe strigosa*. Characteristic species among others for the Mallee Heath are *Acacia aconthoclada*, *A. calamifolia*, *A. rigens*, *Baeckea behrii*, *Banksia ornata*, *Callitris verrucosa*, *Casuarina muelleriana*, *Grevillea pterasperma*, *Leptaspermum coriaceum*, *Melaleuca uncinata* and *Triodia irritans*. This association is a very rich one in species, and as the term heath implies, consists essentially of shrubs, taller however than is usual in heath. Among the shrubs present are *Eucalyptus dumosa* and *E. incrassata*, which, however, are to be found more plentifully in the lower elevations. In the northern parts, taller specimens of these and other eucalypt species become common and the taller shrubs drop out but the smaller

remain. Of the species of Epacridaceae, *Leucopogon cordifolius* reaches as far north as Hattah.

There are large areas of loose sandy country populated almost exclusively by *Eucalyptus incrassata*, *E. dumosa* and *Triodia irritans* and which therefore lack the other characteristic heath species. These sands may be of more recent origin than the heath country and the present occupants are the first settlers. To the east of Ouyen are ridges, clothed with very small mallee and with abundant porcupine grass and other members of the heath community, which are capped with loose sand which readily moves with the wind and which is also probably of late origin. Typical heath plants *Grevillea ilicifolia*, *G. pterosperma*, *Melaleuca uncinata* and *Micromyrtus ciliatus* occur near Kulwin. Further east at Yungera, on abandoned farm land, are also typical Mallee Heath plants, *Acacia bynoeana*, *A. rigens*, *Callitris verrucosa*, *Olearia lepidophyllum* and *Olearia rudis*.

It is possible that not all plant geographers will agree to include this north-eastern section with the heath on account of the Mallee eucalypt upper story, but the understory is certainly not that of the limestone country. Herein possibly lies, in part at least, an explanation of why so much unsuitable land has been opened for settlement. The lower story is a better indicator of the soil than the upper. Owing to the density of the scrub growth of the Heath, annuals are not a conspicuous feature of this association and this is the case with heaths generally.

LAKE FLOORS

The vegetation of the lake floors is not yet a unit, for change is still going on. Some lakes have a little water in them. Some are just bare salt while others carry varying depths of soil. In the far north appears the most primitive colonization of new land with the rare *Pachycarpha triandra*, but as this area lies within the influence of the River Murray it is not considered here.

When the lake is dry and has been covered with soil the pioneers are the succulents *Arthrocnemum haloenemoides* and *Mesembrianthemum australe* and to a lesser extent *Salicornia australis*. These species do not give a complete cover for there is plenty of bare land between the individual plants. A bright colour is given to this community by species of *Frankenia*. There is also present in the spring a variety of small annuals. Where soil is accumulating the salt bush *Atriplex vesicarium* occurs and this suggests that ultimately these areas will be a salt bush association.

In the northernmost part of the Mallee just south of the influence of the River Murray, true salt bush steppe occurs, but it is not of great extent. The chief component of this area is the shrubby salt bush *Kochia pyramidata*. Not very common but very striking in appearance owing to its whiteness is the Dense Bluebush *K. sedifolia* and there are also three other blue bushes. Very abundant

and very irritating is *Bassia patentiuspis* whose fruits have sharp spines on them. This association is a fairly dense scrub about 3 feet high and is related to other plant associations in still drier parts of Australia.

Some of the large genera of the Mallee exhibit, in their species, a series of characters commonly associated with arid conditions, such as absence or smallness of leaves, hairiness, spines, exudations, etc., and the presence of these in the one genus gives a very great individuality to the species. In the genus *Eremophila* which is almost exclusively confined to the Mallee the species exhibit dense hairiness in *E. glabra* var., spinescence in *E. divaricate*, and silvery scales in *E. scoparia*.

The genus *Olearia*, which unlike *Eremophila*, is found widely in the State, from the Alps to the coast dunes and to the Mallee, exhibits a wide range of specific characters. *O. pimeleoides* has hairy leaves while those of *subspicata* are glabrous and recurved. In *O. lepidophylla* the leaves are very small and more or less spherical resembling grains of sand. *O. rudis* is readily recognized by the scabrous leaves while *O. decurrens* has both leaves and branchlets covered with a resinous exudation. Such characters as these bring us to another aspect of the Mallee and can therefore be left to another occasion.

"THE ART OF BOTANICAL ILLUSTRATION"

By WILFRED BLUNT.

(No. 14, *New Naturalist Series*. Collins, London. 21/- sterling.)

From earliest times to the present day botanists have found it necessary to supplement the written descriptions of plants by drawings, and these have varied from the botanical to the artistic, from the realistic to the stylized.

Wilfred Blunt has made a study of these drawings, bringing to the subject the eye of a gifted artist and the scholarship of patient research. His selection of illustrations for the book has been chosen not to display plants, but to clarify and illuminate the text, and the result is unique in combining in one work, the history of science and of art, showing how developments such as the introduction of new species have influenced botanical illustration no less than developments in the technique of reproduction of the paintings and drawings themselves.

Throughout the book one meets as individuals the great illustrators of the past; many of them are well known as botanists, others were engravers and painters rather than botanists. They are well known to-day not only by their work, but by the plants to which their names have been given. *Brumfelia*, *Fuchsia*, *Baeria*, *Ehretia*, *Mattiolus*, these and many other plant names take on a new interest and individuality when one has read Mr. Blunt's book and come to know the artists after whom they were named.

To-day the great tradition of botanical drawing continues. Stella Rosa Craig in England and Margaret Stones here in Australia are working in a succession that began in the 6th century with the *Codex Vindobonensis* of Dioscorides.

Unfortunately there is no copy of this book in the F.N.C.V. Library, but a copy will be on display at the next General Meeting. It is a book many members will wish to buy for themselves.

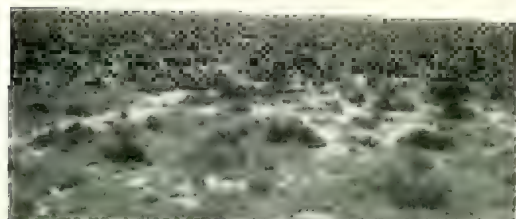
—M.M.C.

PLATE III



Elphinstone Lake just out
side the Mallee, now
covered with /
pasture.

Raak Lake: floor of
salt.



Raak Lake: partly
covered by vegeta-
tion.

THE KEILOR TERRACES

By A. A. BRUNTON, Melbourne

At the July meeting of the Club a large quartzite core, worked by the blacks, was exhibited. This core, now the property of the National Museum, was found in the Keilor sandpit on the Maribyrnong River at a depth of 8 feet below the surface of the upper Keilor terrace, and about 36 feet from the site of the prehistoric skull and bones discovered there in 1940. The age of the upper terrace is in dispute and the time estimates vary from not less than 12,000 years to as high as 130,000.

During the last century it was a common belief that the Australian aborigines had arrived in this continent at a very late date. Estimates of the time of their coming varied from 5,000 to 10,000 years ago. Since then a far longer period has been generally conceded. Unlike Europe, the people of this land did not live in caves and so a vast accumulation of debris in stratified layers, from which much information could be obtained by scientific excavation is not available here. The Australian climate was ideal for living an outdoor life at all seasons, and as there were no wild animals dangerous to man there was no necessity to take refuge in caves, as in the old world. So one great source of information has been denied the student here.

But there are other things which point to a great antiquity. One is the extremely complicated systems of marriage relationships, customs, legends and beliefs of the different tribes. Each one of these knew their own special tribal territory intimately, and every rock, gully or hill had its own special name and some legend of the far past attributed to it. Only by a very long residence in this continent could such things be

After the discovery of the Keilor skull Mahony and Keble spent much time and effort in an endeavour to arrive at the age of the terraces, and they both came to the conclusion that they were formed in the Riss-Wurm interglacial period, and estimated the age of the upper one to be 130,000 years. If this is correct the following must have occurred. Owing to the melting of the ice sheets the sea rose at least 103 feet above its present level and invaded the Maribyrnong valley at Keilor, forming a tidal lake with very little rise and fall. The present rise and fall of the river at its confluence with the Yarra is 2 feet, and may have been less then if the entrance to Port Phillip was smaller than now. Into this lake at Keilor the Maribyrnong ran for a vast period of time, filling it with silt as the water gradually rose to the height of the present top terrace. At one stage the owner of the skull and his companion were camped on the northern edge of the lake. They had a fire going, for a layer of ashes was observed alongside the remains.

What happened is not beyond all conjecture. They probably disagreed about the high cost of living and settled the argument with quartzite cores, and so left bones of contention for posterity. The water rose higher and the silt eventually covered them to a depth of 18 feet. When the temperature fell the sea level went down also, owing to a rebuilding of the ice sheets, and the river cut its way through the valley of silt and eroded its bed in the underlying Silurian rock, leaving the great bulk of the terrace intact. Twice again the sea rose, but not so high as the first time. The subsequent falls resulted in the formation of the two lower terraces.

At the time all this was going on in Victoria, the same thing was being enacted on the Thames, Somme and other rivers in Europe and elsewhere, the sea being a universal spirit level. The three terraces on the Thames may be identical with the three here. The 107-foot terrace at Swanscombe with its famous skull is believed to have been laid down very late in the long Mindel-Riss interglacial and the age of the skull is given as 270,000 years. But this age, as well as Mahony and Keble's 130,000-year estimate, is anathema to the younger generation of geologists and ethnologists. They point to the apparent youthfulness of the terraces and the small amount which has been eroded away at Keilor. The terraces on the Thames are but fragments. The reason for all this is simple.

The climate of England through the last million years has been much colder than here. Keilor is in the corresponding latitude of southern Spain and Tunis. Every winter on the Thames there would be continual freezing and thawing of the moisture in the terrace. The result is that the ice expanding has a heaving effect, and on the slightest of slopes the soil moves forward and downward. This action is known in geological jargon as solifluction, and results in the material composing the terraces being gradually pushed into the lowest part of the valley where the stream carries it away and deposits it elsewhere. Here in Victoria, owing to the warmer climate, there may have been little or no solifluction to degrade the terraces; also before the coming of the whites they were always covered with bush which protected them from erosion. The silt is very porous and the surface water soaks downward and finds its way to the river on the surface of the underlying Silurian rock.

Another theory has been put forward lately to account for the fineness of the terrace soil. It has been suggested that it was deposited in the valley as loess by the wind during some dry period of dessication. Some of the Somme terraces contain loess. But there are objections to this theory. One is that in the sandpit you see stones in the face which could not have been brought there by wind. The men working the pit for foundry moulding sand threw many of these aside. The quartzite core exhibited weighs about 40 lbs.

But now a new method of determining the age is being tried. This is the radioactive carbon method, and relies on the presence of radioactive carbon in organic matter, and has been described thus. Ordinary carbon is C^{12} and the radioactive isotope is C^{14} . It is formed from nitrogen in the upper atmosphere, under the influence of cosmic rays. It is found in carbon dioxide which as a gas readily diffuses throughout the atmosphere. Some of this is taken up by plants and thus incorporated in the cycle of life. In the air a fixed ratio exists between C^{12} and C^{14} , since there is equilibrium between production and decay of C^{14} . But once carbon has been incorporated in organic matter, the proportion of C^{14} to C^{12} decreases, and a measure is provided for the age of the organic matter.

C^{14} releases one electron and changes into nitrogen of the same atomic weight. Its half-life period is about 5,720 years (± 47 years), and quantitative determinations are possible between A.D. 1000 and 30,000 B.C. The real difficulty of this method is the need for concentration of the radioactive carbon before tests can be made. Because of the exceedingly small amount of radioactive carbon present in organic matter, large quantities of fossil material are required for this purpose, and these are often difficult to obtain, at any rate in the case of fossil bones or objects of archaeological interest. For wood and large bone accumulations, such as kitchen midden, the carbon method undoubtedly offers possibilities, but it is unlikely ever to lend itself to estimating the age of specimens older than the latest Pleistocene.

Since the above was written some further facts about the method have been established. Wood and peat give the best results but care must be taken to ensure that the roots of modern plants have not penetrated the trial specimens. Dates found in the fourth geological ice age appear much less than the estimates of the geologists. The volcano Mazama in Oregon blew up according to the geologists 16,000 years ago, but by using an overwhelmed tree for carbon the date is given as $6,453 \pm 250$. Charcoal, with Folsom dart points among it, gives $9,883 \pm 350$, instead of the 25,000 given to that culture. The paintings in the Lascaux Cavern which appear so wonderfully fresh, are, by charcoal from a hearth in the cave, $15,516 \pm 900$.

The latest estimate of the limit to which this dating method can go is 20,000 years, but by improvements in procedure it is expected to be further extended, but not beyond the late Pleistocene. So if the radioactive carbon test fails to register on any material from the Keilor terraces we can be sure that they were not laid down recently, and our up and coming geologists and ethnologists will have to try something else to disprove the Mahony and Keble theory.

KOALAS IN THE GIPPSLAND HILLS

Although so much of the original forest has been entirely destroyed on the ranges that lie south from Morwell, we still see an occasional "native bear," perhaps half a dozen of them during the course of the year. They evidently travel quite a distance across country between known food trees, usually during the hours of darkness, but we have met with them on the ground during the day, too.

Manna Gums do grow along the upper reaches of the Morwell River, but koalas seem to favour the local form of Bluegum (*Euc. bicostata*), which was once the principal timber of many of the hill spurs. In earlier days Bluegum country rated highly with selectors, and to-day there remain only comparatively few trees, mostly young ones in inaccessible places.

On our farm at Budgerce stood one stunted bushy Bluegum, at the head of a gully. It always had a "moth-eaten" appearance and was seldom well clothed with leaves. The reason, we found, was a visiting koala which would appear in the tree one morning and stay until the food supply ran short, which might be several weeks. It would then depart, as unobtrusively as it came. There were no trees of the same kind for at least half a mile in any direction. No sooner had a nice fresh crop of foliage grown again than a large furry ball would be noticed sleeping in one of the highest forks. We supposed that bear had a regular round which kept it busy throughout the year—when the last tree was eaten out, the first one would have freshened up once more.

There can be no doubt that fire has been, and still is, the great enemy of koalas. There are still fairly large areas of Messmate-Peppermint bush, with a sprinkling of several other eucalypts, on the northern slopes of the hills. Much of it is privately owned and subject to severe burning off at intervals. Pulp cutters take only the best parts of the tree trunks and leave a welter of limbs and leaves, ripe for burning, amongst the thickets of acacia and dogwood which are themselves the aftermath of earlier fires. Ground-dwelling animals and even lyrebirds can run before a slow-burning fire front, but the unfortunate tree-dwellers must perish miserably.

It would seem that the planting of Bluegums on a large scale in the hills (they are fast growers on their native heath) would attract and maintain the remaining koala population and arrest the decline of their numbers in this part, at least, of Victoria.

—E. LYNDON, Yinnar.

STRENUOUS EXCURSIONS

A glance at excursion reports in the special Helmeted Honeyeater issue of the *Vict. Nat.* published in 1933 and a note of the small numbers who had attended some recent excursions make one wonder whether we have degenerated from "field" naturalists into "picture show" naturalists.

A 1933 excursion to Wattle Glen on a very rainy day attracted some twenty persons, while twenty-seven members and friends attended a Saturday afternoon excursion to Frankston, and a list of excursions shows that these were held weekly. Recent excursions to these same areas have attracted very much smaller numbers, but the "tourist" excursions, including 200-mile motor coach trips, have attracted good attendances.

Have we become so afraid of healthy walking exercise in the open air that we must be transported everywhere in motor vehicles? A recent excursion to the Loch Valley and Noojee with a motor coach which had a very temperamental engine causing the party to traverse considerable distances on foot, and an excursion to Mt. Piper last year which resulted in a walk for many miles through pouring rain, make us wonder whether perhaps the "tourists" are doing more than their share of walking and whether we are the soft ones who go on the easy walking excursions.

—A. E. BROOKS.

IN THE ALTHOFER COUNTRY

By the REV. H. M. R. RUFF, Northbridge, N.S.W.

The Althofer brothers, George and Peter, are already widely known for their enthusiastic advocacy of the cultivation of our Australian native plants; and their printed catalogues of those which they successfully propagate at their nurseries near Dripstone, on the Central Western Slopes of New South Wales, are probably familiar to many readers of this journal. Last spring it was my good fortune to be invited by Mr. and Mrs. Norman Loader, of Castlecrag, near Sydney, to accompany them on a visit to Dripstone, where they wished to obtain a supply of native plants for their delightful property at Castlecrag.

Dripstone lies about ten miles out of Wellington, on the railway line linking that town with Orange. From Orange, nearly 3,000 ft. above sea level on the Central Tableland, the country declines in height over the Central Western Slopes to about 1,000 ft. at Wellington. The Althofer brothers took me on an excursion to the upland scrubs towards Orange. They had hoped to let me see something of the orchid flora (see *Vict. Nat.*, Vol. 63, Aug. 1946, p. 101), but the excessive rains of the year 1950 had kept these plants from developing to any extent. Wellington's average annual rainfall is 23 inches; from January to the end of September, 1950, nearly 50 inches had fallen!

Nevertheless, the general flora of the country we traversed was extremely interesting, such genera as *Acacia*, *Pultenea*, *Daviesia*, *Dillwynia*, *Grevillea*, *Styphelia*, *Leucopogon*, and *Colliris* being prominent. I think the gem of this excursion was a tall, slender shrub of *Acacia verniciflua* in full bloom at Kerr's Creek. *A. lanigera* was also very showy. About Dripstone and Wellington there is a very beautiful form of the variable Darling Pea, *Swainsona galegifolia*, with light pink flowers. We did make one new orchid record for the district—*Pterostylis cynocephala*. *Diuris brevissima* was found near Kerr's Creek; other orchids seen were *Caladenia cornea*, *C. angustata*, *C. dilatata* var. *toxochila*, and *Glossodia major*. But the usual bewildering wealth of forms exhibited by the genus *Diuris* in this area was absent.

With the arrival of Mr. and Mrs. Loader, attention was focused for a whole day on the Nindethana nursery, which of course I had explored beforehand. The incessant rains of the winter months had turned the place into a quagmire, and Mr. Althofer was lamenting the loss of some of his choicest shrubs from the dry interior. Nor could he cope with the rank growth of grass and weeds everywhere, as the ground was too wet. Nevertheless we revelled in the lovely things from every State growing there—far too numerous to specify. Western Australian *Myrtaceae* and

Proteaceae particularly excited our admiration, but there was an *Acacia* from that State which drew us irresistibly time after time: the glorious *A. saligna*, from the neighbourhood of King George's Sound. From New South Wales, Victoria, South Australia and Queensland there were many lovely species of *Grevillea*, *Prostanthera*, *Westringia*, and *Eremophila*.

Next day Mr. George Althofer guided us on what proved to be one of the most wonderful botanical excursions of my life. We first drove 31 miles to Dulibo, and then turned in the direction of Gilgandra, and about 18 miles out arrived at the Gannoo Forest Reserve. I cannot attempt any adequate description of this forest. Within it, we drove hither and thither for about 21 miles; and there was never a moment (save when we passed through a small cleared selection) in all those miles when we were not flanked on both sides, as far as we could see, by acres and acres of lovely flowers. *Calytrix* was, I suppose, the dominant shrub throughout; many Victorians know how beautiful it can be, especially when growing in great profusion. But it was closely attended by various species of *Acacia*, *Dillwynia*, *Prostanthera* (including the rare *P. leichhardtii*, with its curious blue-green flowers), *Westringia*, *Boronia*, *Phebalium*, *Zieria*, *Kunzea*, *Melaleuca*, *Leptospermum*, and a host of other things.

Two very beautiful species of *Phlotoeca* were plentiful. *Dampiera maideniana*, with masses of deep royal-blue flowers, and *D. adpressa*, of a lighter shade, excited our admiration at once. Quandongs were in full bearing; Flannel-flowers were just beginning; beautiful specimens of *Drosera glanduligera* studded the soil with scarlet, and in damp ground there was an abundance of the ever-interesting little *Levenhookia dubia*. But I think the loveliest of all the many lovely things we saw that day was *Ricinocarpus boremanii*—white and pink, covering several acres.

We picked up *Pterostylis cycnocephala* again in the forest. Almost the only other orchids seen were some remarkably fine specimens of *Calochilus robertsonii*.

Next day we were to leave for Sydney, having planned to spend an hour or two on the western fall of the Blue Mountains. But the weather, which hitherto had been perfect, decreed otherwise. We drove out of Wellington in heavy rain, which became worse and worse as we proceeded. The annual Cherry Blossom Festival at Orange was to have been held that day, but had to be abandoned. Around Bathurst the water was running over the road—in fact it rained for almost the whole 240-odd miles from Wellington to Sydney. We felt we had had such a splendid time among the western flowers that we could not complain; and the cool, wet day enabled us to get all our plants and specimens down in perfect condition. So we were well content.

SOME NOTES ON CASSINIA

With Description of a New Species

By N. A. WAKEFIELD

Robert Brown's generic name *Cassinia*, as published by him in 1817 (7 trans. *Linn. Soc.* 12: 126) has been conserved (ref. *Kew Bull.* 1940, p. 128). This action was necessary because of the premature publication of the name in 1813 (ex Aiton, in *Flort. Kew*, ed. ii, 5: 184). Aiton listed and described a species "*Cassinia aurea* R. Br." thereunder, the identity of which was *Angianthus tomentosus* Wendl. (of 1809). As Robert Brown used the combination "*Cassinia aurea*" again, for a different species, in 1817, the latter—a later homonym—cannot stand, and hence is here designated as:

CASSINIA AUREO-NITENS, nom. nov.—Syn. *Cassinia aurea* R. Br., l.c. 127 (1817); non R. Br. ex Ait. l.c. 185 (1813).

The last comprehensive summary of the Australian members of the genus *Cassinia*, appeared in *Flora Australiensis* (3: 584-9, Jan. 1867). Perusal of the large suites of material now available in the main Australian herbaria indicates the necessity for the following adjustments to Bentham's delimitation there of the species:

CASSINIA TRINERVA, sp. nov.

Frutex; foliis angusto-lanceolatis, circa 5 vel 7 cms. longis, fuscis, supra glabris vel glanduloso-scabris, subtus trinervis ramulisque glandulosis; corymbis magnis, albidis; capitulis angusto-ovatis, circa 3 vel 4-floribus, saepe spaleatis; involucri squamis externis pellucidis, intus apice duris albidis.

HOLOTYPE: "Paramatta, Woolls." (Melbourne, and duplicate at Kew.) This material is cited by Bentham under *Cassinia longifolia* R. Br. (l.c. 586.) An erect shrub with glandular branches and no cottony tomentum; leaves flat, narrow-lanceolate, about 2 or 3 inches long, dark-coloured, glabrous to glandular-scabrid on their upper surfaces, underneath glandular and with conspicuous near-marginal ribs; inflorescence large, white, corymbose, heads small, sessile, narrow-ovate; outer involucrel bracts short, transparent; inner ones with hard, white, concave apices; florets 3 to 4 in each capitula, with few or no inter-floral paleae; corolla reddish-brown when dry.

The species is closely allied to *C. aureo-nitens*, which has a golden inflorescence and a flavescent colouring on the upper branches and the under-surfaces of the leaves. *C. trinerva* has, until the present, been included under *C. longifolia*, which has single-veined leaves with rolled margins and a tightly appressed tomentum beneath them.

C. trinerva is apparently not uncommon in south-eastern New South Wales, ranging from the Blue Mountains southward into Victoria (East Gippsland, Black's Spur, Olinda), and reaching the north-eastern extremity of Tasmania.

CASSINIA UNCATA A. Cunn. ex DC. must stand as a species. It was designated by Bentham as a variety of *C. aculeata*, and it includes also Mueller's Macallister River specimens commented upon in the same place.

C. uncata has long or short, asperous to smooth leaves, always rolled quite terete, mucronate and usually uncinatc; a variable degree of white tomentum or glandular asperities; corymbs large or small; but the narrow, often yellowish heads have the bracts usually conspicuously 3-seriate. It ranges from Wallangarra in extreme south-east Queensland, through all eastern New South Wales (including the alps), and is scattered across Victoria, being abundant in parts of Gippsland.

Cassinia complanata J. M. Black, may be only a desert form of *C. uncata*; but it is much smaller in all its parts and has wrinkled leaves always quite smooth. Its habitat is in Mallee scrub areas of South Australia, Victoria and New South Wales.

CASSINIA ADUNCA F. Muell., must be distinguished too. It has terete, usually very asperous leaves, and unique 5-seriate bracts with outward-curving acute apices, and the florets number 10 to 17 in each head. Its habitat is inland New South Wales and South Australia.

CASSINIA ACULEATA (Labill.) R. Br., under which Bentham placed the specimens he examined of the three preceding species, is distinguished at once by its often broad, always more or less aculeate leaves, and particularly by its distinctly dimorphic often pinkish bracts which are never seriate. The lower outer bracts are round and papery; while the inner ones have white apices, usually hard and concave, but inclined sometimes to be crenulate. It ranges throughout Tasmania and Victoria to South Australia and eastern New South Wales.

CASSINIA COMPACTA F. Muell. of south-east Queensland and north-east New South Wales, should be broadened to include Bentham's var. *straminea* of *C. longifolia*. The foliage of the comprehensive species is broad or narrow, rolled or flat, smooth or asperous; but the heads are uniform, being broad with straw-coloured bracts with transparent apices.

CASSINIA CUNNINGHAMII DC., must be transferred back from the genus *Helichrysum* where Bentham placed it. These two genera are usually distinguished mainly by the presence or absence of paleae on the involucre between the florets. In *Cassinia*, each floret is subtended by a palea placed on the outer side of it, so that, when there are less than four florets in a capitula, there are no paleae actually between them. Specimens of *C. Cunninghamii* show heads with either three florets, without paleae between, or else 4 or 5 florets with one or two inter-floret paleae. The same variation has been noted in *C. aculeata* and *C. trinerea*.

In such cases of reduction in *Cassinia*, the generic placing of the species concerned, can be ascertained only by apparent affinities with other species. It has been noted that no Australian species of *Cassinia* has spreading white appendages (rays) on the ends of any of the involucre bracts; and in those Australian *Oenothermoid* species of *Helichrysum* which lack these bract-rays, the florets invariably number 8 or more per head. It is probable that *Cassinia* is a purely Australian genus; and the true affinities of the alleged species thereof in New Zealand and South Africa could well be investigated.

[The description of *Cassinia glaucocephala* Cass. suggests that it is identical with the New Zealand *C. leptophylla* (Forst. f.) R. Br., which would mean that the allegedly Australian type specimen of the former had its origin actually in New Zealand.]

BIRDS AND HERBS

The late Mrs. Coleman's question "Do birds know that herbs have antiseptic properties," in the *Vict. Nat.*, May 1951, alludes to Harry Rurrell's remark on the use of green leaves by owl-nightjars.

Recently at "Kelso," Mount Tamborine, Queensl., on June 15, I was privileged to witness the daily feeding of many birds of the locality—Regent and Salin Bower-birds, Pied Currawongs, Black-backed Magpies, Magpie Larks, Willie Wagtails, White-shafted Fantails, various Parrots, Spinebills, Lewin Honeyeaters, Silvereyes, Spectacled Flycatchers, etc. An outside clam shell forms an ideal bird bath in the garden. Miss Stoddart mentioned that on occasions some of the smaller birds after feeding on fruits of the introduced Red-ink Plant, supposedly poisonous, regurgitated these in the bath, necessitating its cleansing. Invariably after this operation the Black-backed Magpies would arrive to bathe in the fresh clean water. One particular Magpie had a habit of depositing a single gumleaf, never more at any one time, before splashing in the water. Miss Stoddart considered the bird wished to gauge the depth of the water in the shell, but Mrs. Coleman's query possibly points to antiseptic precaution by this sagacious Magpie.

—II, C. E. STEWART.

HELP WANTED

Cairns

During the period 28th September to 6th October next the North Queensland Naturalists' Club proposes to hold a "Wild Nature Show" in conjunction with the "Back to Cairns Jubilee Week" and the Club's President writes to ask for the assistance of F.N.C.V. members in providing exhibits—especially flowers and foliage—representative of all parts of the Commonwealth.

We commend this appeal to our members, particularly the Groups, and trust there will be a good response from those of us who specialize in the cultivation of Victoria's wild-flowers and shrubs.

Exhibits should be air-freighted to the North Queensland Club, c/o the Hon. Secretary, Mr. J. Wyer, "Lochinvar," 253 Sheridan St., Cairns, North Queensland. Such costs as are incurred by the sender will be refunded by the recipient Club.

The President (Mr. A. A. Reid) is to superintend the "Marine Exhibits" section of the Show and he has asked for an exchange of shells with interested members. Our conchologists and members of the Marine Biology Group may be able to assist here. If so, they are invited to write to Mr. Reid at 57 Grove St., Cairns, North Queensland.

Bairnsdale

The Native Plants' Preservation Group asks for local interest and help in Shires of Avon and Bairnsdale, particularly for preserving a very good area east of Perry Bridge. Interested members are asked to get in touch with Mr. O. S. Green, Gould St., Bairnsdale.

LOWER GLENELG NATIONAL FOREST

The proclamation of the Lower Glenelg as a National Forest or Park is recommended by the Committee of the F.N.C.V. which visited the area in April 1947, still hangs fire although all the Government Departments concerned are in favour of the move. The Minister for Lands and Forests is to visit the area in May, and as a result of his inspection some finality is expected.*

Since the Committee's inspection four years ago, another tree-fern gully has been discovered. This contains both Rough Tree Ferns (*Cyathea australis*) and Soft Tree Ferns (*Dicksonia antarctica*)—and Mr. C. Reaughole has added a number of botanical species to the list for the area. Those readers who have the bird list as given in *Vict. Nat.*, August 1947, may like to add the following birds which have been recorded in the forest, or round Nelson, since the Committee's visit: Spotless Crane (*Porzana plumbea*), Fluttering Shearwater (*Puffinus gavia*), Giant Petrel (*Macronectes giganteus*), Fairy Prion (*Pachyptila turtur*), White-capped Albatross (*Diomedea cauta*), Grey-mantled Albatross (*Phoebastria palpebrata*), Fairy Tern (*Ternstroemia*), Grey Plover (*Squatarola squatarola*), Banded Stilt (*Cladorhynchus leucorhynchus*), Red-necked Avocet (*Recurvirostra nova-hollandiae*), Curlew Sandpiper (*Erallia testacea*), Little Bittern (*Leobrychus minutus*), Pink-eared Duck (*Mallardus membranaceus*), Golden Bronze-Cuckoo (*Lamprolaima phaeopus*), Pink Robin (*Petroica rudinogaster*), Chestnut-tailed Ground Wren (*Hylacola pyrrhopygia*), Spiny-checked Honey-eater (*Atanthera rufogaster*).

—NOEL F. LEARMONTH, Portland.

BOTANICAL NOMENCLATURE

In conformity with present practice overseas, this Journal will use small letters for all specific botanical names.

* See reference in Proceedings.—Ed.

—Editor.

WHAT, WHERE AND WHEN

General Excursions:

Sunday, August 19—North Williamstown. Subject: "Mangroves." Leader: Mrs. Pinches. Train: 9.47 a.m. Williamstown, fare 1/1, alight North Williamstown; 4-mile walk. Bring lunch and afternoon tea.

Saturday, August 25—Day excursion, by motor coach, to Bendigo and Whipstick. Subject: "Gold Centenary, and Hakea and Golden Wattles." Leaders: Members of Bendigo F.N.C.V. Coach will leave Batman Av. 7.30 a.m. sharp, return to city 9 p.m. Fare, including midday meal, 27/6. Bookings, Mr. H. Stewart, 14 Bayswater Tce., Ascot Vale (FU 1096).

Saturday, September 1—Chandler's Boronia Farm, Boronia. Leader: Miss I. Watson. Train: 1.38 p.m. Ferntree Gully, alight Boronia, fare 3/2 second return. Bus details at August meeting.

Preliminary Notice:

Wyperfeld National Park—Intending members please note that the date will be a week earlier—September 1, not September 8. The party plans to leave Melbourne on Saturday, September 1, by private car, and to camp in the Park. Members will need to bring their own tents and to cater for themselves. Meat, bread and tinned food can be bought at Rainbow, by arrangement, on the way. Further details: Miss M. Elder, 17 Adelaide St., Malvern (U 7297).

September 27—Show Day Excursion, by motor coach, to Taradale. Leader: Mr. Ivo Hammet. Coach will leave Batman Av. 8 a.m. sharp. Bring two meals. Bookings, Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1.

Group Fixtures:

Tuesday, August 21—Native Plants Preservation Group. At home of Miss W. Waddell, 3 Denham Pl., Toorak, at 8 p.m.

Monday, August 27—Botany Discussion Group. Royal Society's Hall, 8 p.m. Subject: "Oreliids," by Mr. Ros Garnet.

Tuesday, September 4—Geology Discussion Group. Royal Society's Hall, 8 p.m. Monthly meeting. Subject: Fossil Invertebra—Their Life and Form, 4th Group, "Anthozoa-Graptolites," by Mr. A. A. Baker.

Saturday, September 8—Geology Discussion Group. Excursion details at monthly meeting

J. BLACKBURN,
Excursions Secretary.

A DOUBLE FORM OF EPACRIS IMPRESSA

During a holiday visit to the Grampians in October, 1950, I was fortunate to find a splendid double pink form of *Epacris impressa*, and when discussing this specimen with one of the older residents of Hall's Gap I was interested in the following claims that he made regarding its occurrence:

1. Very few double-flowered heath plants have been found over the years, and then usually in a pink or red specimen; to find a double white form would be even rarer.

2. Double forms are later in flowering. This was certainly the case with the one I found, for it had both flowers and buds, while most other plants in the vicinity had long since finished flowering and had formed seeds.

Some of our native plants seem able to vary the form and colour of their flowers with greater facility than others.

J. S. SEATON.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, August 13, 1951. The President, Mr. E. E. Lord, was in the chair and about 120 members and friends attended.

The following were elected and welcomed to the Club: as ordinary Member, Mr. E. M. Jackson; Country Member, Mr. W. E. L. Bebb.

The President presented Mr. George N. Hyam with a Certificate of Honorary Membership and spoke of Mr. Hyam's untiring efforts to further the aims and objects of the Club. In his brief reply Mr. Hyam expressed his willingness to assist the Council and members at any time it is in his power to do so.

The President expressed the regret of members at the death of Professor W. E. Agar, O.B.E., M.A., D.Sc., F.R.S., on July 17 last. Professor Agar joined the Club in January, 1920, and until his retirement from the Chair of Zoology at the University of Melbourne he had made the Club excursion to the Zoology School an annual event which members recalled with considerable pleasure. Members stood in silence for one minute as a mark of respect.

The Hoadley County Boy Scouts' Association is holding a course in nature lore for young Scout leaders on Saturday, September 22 and October 6, and appeal to the Club for two leaders on each of those days. Members willing to assist are asked to contact Mr. W. L. Williams, Assistant Commissioner, Hoadley County, at 19 McCracken St., Essendon, W.5.

Miss Waddell introduced Mr. Bull, who is petitioning the Shire of Winchelsea in an endeavour to have the destruction and felling of blue gums stopped at Lorne and surrounding district. Members were asked to give their support by signing the petition.

The organizers of "Save the Forests" Campaign would be grateful for the loan of any 16 mm. film relating to flora. Members wishing to assist are requested to contact Mr. E. M. Jackson, "Save the Forests" Campaign, 422 Collins St., Melbourne.

The Chairman reminded members that subscriptions are due and appealed for the early payment of same. The Club budgets on the lowest possible subscription, and delay in payment of these can cause financial embarrassment.

The evening was given in memory of the late Mr. W. H. Nicholls, the leader being Mr. J. H. Willis. He announced that Messrs. David Mathews and B. Reeves were unfortunately prevented from being present to assist. Mr. Willis read a message from the Rev.

Mr. Rupp. Mr. Willis spoke with deep affection of some of the happy memories he has of Mr. Nicholls, the amazing capacity for work, the modesty and humour, the rare companionship of this brilliant naturalist and great man. At Mr. Willis' invitation Miss Waddell, Messrs. Hammet, Müller and Stewart spoke of their association with him, then followed a screening of a selection of Mr. Nicholls' slides of W.A. flowers with commentary by Mr. Willis.

EXHIBITS

FLOWERS—Large variety of native flowers, garden grown—Mr. J. S. Seaton, Mr. R. Savage, Mr. I. Hammet.

"THE GEOLOGY OF THE COMMONWEALTH OF AUSTRALIA"

(BOOK REVIEW)

Members of the Club, and particularly those with a leaning towards the fascinating study of rocks, have now the opportunity to delve deeper into such studies by the recently acquired, comprehensive and authoritative work on the geology of Australia by the late Sir T. W. Edgeworth David.

This work, published as two volumes of text and one of maps, was commenced in 1924 by Sir Edgeworth, but was interrupted by his death in 1934. Realizing the importance of such a project, Dr. W. R. Browne fortunately undertook to complete and edit the entire manuscript—some 1,300 pages of descriptive matter, together with some hundred sections, maps and photographic reproductions.

Volume I describes the history of the rocks from the Pre-Cambrian to the Recent: the Australian student of geology is fortunate in that the full sequence of time periods between these two ages is amply represented in Australia. Each geological period is given—firstly, as a general introductory, then as regional description, finally rounded off as tectonic and economic geology.

An entirely new work is the geology of Australian New Guinea, while at the end of each chapter a bibliography on each subject is particularly gratifying, adding much to the reader's knowledge.

The second volume is divided into two parts; the first presents the physiographic features of Australia, commencing (as in Volume I) with a generalized description, and then dealing with each State separately, finalizing with a history of the subject. A separate chapter in this volume introduces one to the new and very important study of Australian soils. Part II of this volume is devoted to Economic Geology, the natural resources of the Commonwealth forming an important study both from the natural and scientific angle. The mode of occurrence of minerals, from gold to salt; the important uranium-bearing rocks; coal deposits; oil and artesian water—these are but a few of the subjects presented. Again, a useful bibliography of each subject is appended.

Volume III contains coloured geological maps of the continent, including several cross-sections. Printed in four sections, the large map measures six feet by five feet six inches. Originally, it was published with one volume of explanatory notes by Sir T. W. E. David in 1932. A separate new map of Australian New Guinea is included, as an addition to our knowledge of the northernmost portion of the Commonwealth.

Altogether, this work forms a complete geological library compendium, written in a manner as suitable for the general reader as for the ardent student, and is invaluable to those who seek for references within its covers.

—ALFRED A. BAKER.

RESUPINATION IN ORCHIDS

By REV. H. M. R. RUPP, Northbridge, N.S.W.

"The vast majority of orchids possess resupinate flowers." This statement will doubtless be received without enthusiasm by many readers, for the simple reason that they have no idea what resupination means. Yet the known facts in connection with it are not only of great importance, but are the gateway to one of the most fascinating fields of botanical study. Far too little attention has been paid to it by Australian orchid students. This brief article is offered as a belated but sincere attempt to stimulate interest in the subject, for the investigation of which there is ample scope among our five or six hundred species of native orchids.

First then let us see what resupination means. The term was in use nearly 200 years ago, when it was defined thus:

A Resupination; which is, when the upper Lip of the Corolla looks towards the Ground, and the under Lip towards Heaven. (Lee.)

Putting this into more modern orchidological terms, we may say that an orchid flower is resupinate when the labellum or "lip" occupies a low place among the floral segments, and the dorsal sepal the highest place. A moment's glance at such well-known orchids as *Caladenia carnea* or *Calochilus robertsonii* will serve to suggest that these are the normal positions for the labellum and dorsal sepal in most orchid flowers. Yes; *but they were not always so*. Actually the labellum is the "upper Lip"; and it still is the upper lip when the flower-buds are formed. But as the flower is developed, either the ovary or its pedicel is TWISTED through 180 degrees, bringing the labellum down to the position so familiar to us, and raising the "lower Lip" or dorsal sepal to become the highest segment. This is the process of resupination.

And its purpose? Most of us know that an orchid flower has three sepals and three petals. In each instance two of these segments form a pair, and the third is "on its own". In the course of the evolution of the flower, the third petal (originally the uppermost of all the segments) in the overwhelming majority of species becomes greatly modified, differing remarkably from its paired fellow-petals; and we call it the *labellum* or lip. Its modifications in the various genera and species are practically innumerable. Frequently the labellum becomes by far the most conspicuous part of the flower, arresting our attention by the diverse shapes and colours assumed, or attracting insects by the secretion of "nectar" of various kinds. In fact the attracting of insects is almost certainly the object of all these modifications of the labellum, the exploring of which leads them into contact with the reproductive mechanism of the column, and makes them the unconscious agents of fertilization. But so long as the labellum remained the uppermost segment of the flower,

"looking towards Heaven," insects would have to explore it upside-down. Now we may assume that for some insects this would be no great inconvenience; in fact, as we shall see, some orchids still have the labellum uppermost. But by other insects this upside-down approach would not be appreciated. If their visits were discontinued, pollination might fail. Therefore in the evolution of the flower their objections are met by the process of resupination, which brings the labellum down and makes it function as a convenient platform on which the insects can alight without effort.

But we have just seen that there are some orchids which still have the labellum uppermost. Why, then, does not this process of resupination take place in *all* orchid flowers? We commonly speak of certain of our Australian orchid genera (*Prasophyllum*, *Cryptostylis*, etc.) as having their flowers *reversed*, because the labellum is above and the dorsal sepal below. As orchid flowers are actually "reversed" by resupination, surely it is wrong to describe a flower where the labellum occupies its original position as "reversed"? Well, the extraordinary fact is that where such orchid flowers have been thoroughly studied, the investigation has led to the following amazing conclusion. For reasons as yet unknown to us, it has become obvious that certain orchid species, and even genera, which have undergone the process of resupination, would be better served by their particular pollinating agents if the labellum were in its original position above not below, the column. Do they then simply "untwist" the ovary or its pedicel? No! **THEY GO ON WITH THE TWISTING** until the flower is completely turned round on its axis; the labellum has described a complete circle!

Surely enough has been said to show what a fruitful field for exploration lies open to those who are disposed to investigate the strange phenomena of resupination among our Australian orchids. Of course much may be learnt from what has been written by overseas botanists in connection with the orchids of other lands. And for such as may have access to public libraries, or to the "exchanges" of scientific societies, I would recommend the following studies in the subject by the late Professor Oakes Ames; *American Orchid Society Bulletin* 15 (1946), pp. 18, 19; *ibid.* 16 (1947), pp. 370-372; *Botanical Museum Leaflets*, Harvard University, 6 (1938), pp. 145-183.

FINCHES

Birds do get in the most unexpected and extraordinary places. One afternoon in mid-May I went to Cape Grant to see the glory of a wild sou'-wester on the rocks. It was a bare windswept spot and only foot high dwarf vegetation for some distance back. Among some low rocks wet with driving spray hopped six small birds—Beautiful Firetails (*Zonae-ginthus bellus*)—certainly the last place I would look for this scrub-dwelling species.

NOEL F. LEARMONTH.

MINERS AND BIRDS

Some Centenary Bird Notes From Bendigo

By WILLIAM PERRY, Eaglehawk, Vic.

This year Bendigo is celebrating its Centenary. Perhaps among the first things which attract the attention of visitors to the district are the heaps of sand and mullock. These, with gullies and hillsides torn about with old mine shafts, crosscuts and drives, are the residue from a century of mining. One hundred years ago, these gullies and hillsides were virgin forests of Red Ironbark, Grey Box and Yellow Gum among other eucalypts, and hundreds of different species of wildflowers.

Although the Bendigo section of the field produced the most gold, it is interesting to note that the largest and greatest number of alluvial nuggets were found in the Whipstick Scrub. Some very rich surface reefs were also found in the Whipstick, and towards the close of the last century this section of the field supported a large population. In my boyhood days the exploration of abandoned mine workings was an interesting and exciting pastime. Observation of nesting sites of birds among old workings and sand-heaps at this period was responsible for retracing my steps to these old haunts when, in maturer years, bird life became a serious study.

The following notes extending over the last three decades are, for the most part, from observations throughout the Whipstick.

Introduced Birds

Sparrows and Starlings have adopted the mouths of old shafts as nesting sites. They usually prefer timbered shafts, the timber consisting of red-gum slabs, being used to keep the sides of the shafts from falling in. The birds build their nests behind the timber, between the slabs and the rock. I have noticed Sparrows nesting as deep as twenty feet, the position of the nests being determined by dropping a few stones down, and watching the birds fly out from cracks between the slabs. Often the position of a nest is indicated by dry grass and feathers protruding from between the slabs. Starlings, however, prefer to nest close to the surface. I have noted their nests in rotted hollow logs which were originally built as a collar for a shaft.

Swallows and Martins

Both the Fairy Martin (*Hylochelidon ariel*) and the Welcome Swallow (*Hirundo neoxena*) find old shafts and open cuts very suitable for nesting sites; in fact, no other species of bird uses these places to such an extent. Of the two, the Welcome Swallows are the most daring, for their nests are found at greater depths, and in tunnels they fly further in to build. On the southern fringe of the Whipstick is a well mined hill known as Apollo Hill. Its crest is

riddled with shallow shafts, and on its eastern slopes is a long crosscut which tunnels several hundred feet into the hill. For the last thirty years or more, local boys have explored this tunnel. They have dragged bushes and scrub into it, and at the end of the tunnel have lit bonfires. Afterwards, as a grand climax, they scratched their names on the smoke blackened sides, many names being there to-day. For the last twenty years they have not, fortunately, found the nest of a Welcome Swallow, which I have had under observation. Swallows have sometimes built their nests at the entrance of this tunnel, but they have always been destroyed. The nest mentioned is forty-five feet in from the entrance, high up on the wall. I have not visited it every nesting season, but have examined it on many occasions through the years, when it has contained eggs or young. I once took a flashlight photograph of this nest, a piece of sheet iron being bent at right angles, nailed to the wall, and used as a shelf on which to place the flashlight powder. About six inches of water on the floor made operations rather wet and muddy, and in the hurry to leave, I overlooked removing the iron shelf. On visiting the tunnel the next year, I noticed that swallows had started to build a nest on the shelf, but after laying a mud foundation had apparently called off the building project. The old nest contained two eggs. Whether the same birds or the young birds which are bred in that nest return to use it the next season is unknown, but from the continued use of this nest over so long a period there is every reason to believe that this is possible.

On the sides of many old shafts are small holes, usually from fifteen to eighteen inches apart, which were dug and used by the early miners as steps, by which they ascended and descended their shafts in the absence of ladders. It is not uncommon for Welcome Swallows to build their nests in these steps. In a shallow shaft at Adelaide Hill I once saw three of these nests built in steps, one above the other, and all in use. The lower nest had been built on top of an old nest. On looking down a deep shaft at Flagstaff Hill, a Welcome Swallow's nest containing young birds was observed. This nest was at least twenty feet from the surface, with several well developed young birds perched on its rim; in this case, the young bird's first flight would be a difficult, vertical climb.

From personal experience I know that Welcome Swallows do not always wait for miners to vacate their claims before building nests in their workings. Back in the depression days my brother and I decided to sink a shaft at Julius Gully to test some spurs which we fancied might prove payable. Having erected the windlass, the shaft was sunk to a depth of about twenty feet without incident. One morning as we drilled a hole in the bottom of the shaft in preparation for blasting, we suddenly heard a vibrating sound—this was caused by a Welcome Swallow hovering in the shaft, the bird being joined by its mate. During the morning many flights

by the pair were made into the shaft above our heads. Descending after dinner, we were surprised to see the start of a mud nest, about ten feet from the surface, in a depression in the side of the shaft where some slate had fallen away. Every afternoon that we fired our charges, we stood back from the shaft and watched showers of stones and dust belch forth. It was a source of wonder that the nest, which was completed and two eggs laid therein, was never damaged or the eggs broken.

The nest building was of great interest to us, for as we hammered at our drills the swallows continued their work as though we never existed. However, in our absence one week-end, some destructive person climbed down and destroyed the nest, and our bird friends left. With their loss, our luck went also. We never saw a colour of gold, underground water flooded us out, and I am forced to admit that we in no way contributed to the grand total of just on 22,000,000 ozs. of gold which have been won from the Bendigo field.

Fairy Martins favour shallow open cuts and drives in which to build their bottle-shaped mud nests, often a dozen or more nests being built adjoining each other to form a colony. During the winter months some of the old drives fall in. These falls are often due to water seeping in and causing large flakes of slate and quartz to fall from undermined walls, which often follow along the strata. Nests which have been built on such flakes crash with them and are buried in the debris. Nevertheless, a visit to such a place in spring scarcely fails to find new nests being constructed. Martins (Welcome Swallows also) return to the same nesting sites year after year, and damaged nests are repaired. Very often the necks of old nests are broken off and have to be renewed.

I recall one hot day in February, when at the northern end of the Whipstick, an old dray track, overgrown with Green Mallee and scrub, eventually led me to some abandoned alluvial workings. A huge hole which sloped from the surface to some twenty feet in depth extended over an area of two to three square chains. The lower end contained muddy water, and under a sloping earth wall was a colony of Martin's nests. Paddling along the edge of the water, closer inspection revealed that there were twenty-two nests. As the nests were not in use, a bird's beak protruding from one of the openings aroused my curiosity. The bird was dead! Its neighbour had extended the neck of her nest about half-way across the other opening while the unfortunate bird was inside. Unable to force its way out, this bird had starved to death. But this was not all, for on cutting away the neck of the nest which contained the dead bird I found two well-fledged young birds in the nesting chamber, both dead.

Instead of the proverbial two birds being killed with the one stone, it was a case of three birds starving to death through one dab of mud.

Owlet-nightjar (Angothales cristata)

At various parts of the Whipstick lines of old shafts and open cuts extending north and south through the scrub, sometimes for a half mile or further, define where quartz reefs were extensively worked. Well away from habitation, and only visited on rare occasions by fossickers or prospectors, these places are secluded and lonely. From these shafts Owlet-nightjars venture forth on their nocturnal quests for food. In day-time they rest down these shafts, and can easily be flushed by dropping stones. Usually only one pair is flushed from each group of workings, and never the two birds from the one shaft. I once flushed a Nightjar in an open cut at Bolles' Reef. This bird would not fly out of the hole, but flew down a huge cavern which extended downwards into the earth. On being followed the bird eventually ran, or rather shuffled, under some fallen rocks.

The nests of Owlet-nightjars are not often found, and, incidentally, the only nest of this species of bird that I have seen was when a bird was flushed from a hollow stump at Flagstaff Hill. The nest contained five eggs, these being laid on the rotted wood at the bottom of the hole.

Rainbow Birds, Pardalotes and Kingfishers

Heaps of sand and dams, the latter much silted, mark the places where crushing batteries once pounded the gold-bearing quartz. From the quiet stillness which prevails in the Whipstick to-day, one tries to imagine the noise which carried for miles around these crushing plants in the years gone by. Finally, these heaps received the attention of cyaniders, who, as it were, squeezed the last dregs of gold from the sand; gold which was too fine to be retrieved by the batteries. The addition of lime to the sand in the cyaniding process has left these heaps much firmer than they originally were: actually the mixture might be called weak mortar. In this state, burrowing birds such as Rainbow Birds, Pardalotes and the Sacred Kingfisher utilize these heaps in the nesting season.

The Rainbow Bird (*Merops ornatus*) is a lovely migrant to this district for spring and summer. Their nesting tunnels are frequently found in these heaps. Pardalotes excavate their nesting tunnels in sand-heaps also, but they prefer the mounds of soft mullock around shafts. Sometimes they go down the shaft several feet and tunnel into the sides. The alluvial workings at Adelaide Hill are dug in alluvial conglomerate. A nest in the side of a shaft, some three feet from the surface, was once noted: this nesting tunnel was not straight, as the birds had to deviate around some pebbles.

Another beautiful bird, the Sacred Kingfisher (*Halcyon sanctus*) is a spring and summer migrant, nesting in December and January and not uncommonly in sand heaps. I note in my field note-book a record of a nest with young in cyanided sand at Bolles' Reef,

January 4, 1941. Although such beautiful birds, Sacred Kingfishers have very dirty nests. Remains of crayfish and other food rejected by the young birds is not removed, and for close or prolonged observation of these nests the use of a gas mask would be advisable! The nesting holes are short, from twelve to eighteen inches in length. That Kingfishers should live and nest in such a dry and waterless area as the Whipstick may seem strange. However, where there is a sand heap, there is a dam, and with quiet watching these birds are often seen to fly down and pick crayfish out of the water.

I was very surprised on one occasion to find the nest of a Kingfisher on the very edge of a shaft. The entrance was on the shaft side, the nesting tunnel being excavated into the soft mullock which surrounded the mouth of the shaft. I recall lying on my stomach and peering at the white, rounded eggs within, while listening to loose stones which clattered to the depths below.

BIRD OBSERVATIONS AT ALBURY

Mr. Jim Watson, Country Member at Albury, writes (Jan. 11, 1951) *inter alia*: "Finches have been numerous this year, especially the Red-browed Firetail, and Zebra varieties, which have been absent for the past two seasons, but the Diamond Firetail seems constant each year. Dozens of nests of both species were located, usually in briar-rose bushes beside small streams.

"The most interesting discoveries were two new birds noted—a stranger in the White-throated Warbler (*Gerygone olivacea*), and the startlingly beautiful Black and White Swallow (*Cheramocca leucosterna*). No sooner had these two been observed than both were found nesting. What an attractive little hooded home *Gerygone* makes! The Swallows drilled into verticle sandy banks of small dry creeks in the Lavington Hills, only four miles from Albury itself, and not far from the area visited by a few of the members who were here in June 1949. Of course, our old friends the Rainbow Birds and Pardalotes shared the same territory as in years past, but the alarming way these hills are being cleared fills me with foreboding.

"Earlier in the season, a round trip through Holbrook, Culcairn and Walbundrie to the north revealed one new bird type, Noisy Friar-bird, and a nest of the Blue-faced Honeyeater in an old Bahbler's nest, only four feet above the ground! A nesting hole of the Cockatiel was seen also. Crested Bellbirds still exist in this area in fair numbers, but Hooded Robins seem scarcer, and the Red-capped species has not been seen for two years.

"A puzzling feature at Albury is the almost complete disappearance of waterfowl over recent months. Spoonbills, Nankeen Night Herons, three types of Grebe, three of Water-hen, two of Ibis and most types of Duck—all these are missing almost completely. I have not seen an Ibis, Grebe, or Egret for months, yet normally a journey over the Wodonga flats would reveal dozens of these. Seemingly, the floodings on the Darling have attracted most of this bird life, and it may be many years before they return here. During questions asked following a lecture by Mr. P. Crosbie Morrison at the Albury Summer School recently, I mentioned this disappearance, and Mr. Morrison's opinion was that floodings in northern rivers could have attracted them to new feeding grounds, even the feeble-winged Grebes being known to cover hundreds of miles in night flights."

—H.C.E.S.

THE KEILOR TERRACES

(To the Editor)

Sir,—We are of the opinion that certain points made by Mr. A. A. Brunton in his notes entitled "The Keilor Terraces" (published in the August *Naturalist*) should be clarified, viz.:

1. It cannot be proved that the quartzite "core" was the result of aboriginal work, although it may be.
2. The unpublished work of one of us (E.D.G.) was reported erroneously. The suggestion was not that the Keilor Terrace consists of loess but of loessic silt, i.e. silt with certain characters of loess. The stones referred to do not occur in the Keilor Terrace, but in the remains of an older one beneath it. No evidence is known to indicate that the terrace was formed by a tidal lake.
3. C¹⁴ tests have been applied in Victoria but not to the study of the Keilor Terraces.—Yours etc.,

R. T. M. PESCOTT, Director,
EDMUND D. GILL, Palaeontologist,
DONALD J. TUCKY, Ethnologist,
National Museum, Melbourne.

ODE TO AN ORCHID

O thou monocotyledon, I must write a verse to thee,
For, *Sarcochilus parviflorus*, beauty calls to me!
Thou dwellest in the gullies, for thou findest moisture there;
I can observe thy long white roots depending in the air.
With central threads within these roots, thou surely holdest tight,
Thou clingest to the trees, but thou art not a parasite!
Alternately about thy stem, elliptic leaves I see.
And perfumed pendant flowers, in racemes one to three.
Thy flowers in shape are similar to neat *Dendrobium*—
Bilaterally symmetrical with fleshy labellum;
This tongue, beneath my microscope, is covered as with dew.
Thy dorsal sepal's hooded, and thy laterals incurved too;
Thine ovary's inferior—one-celled with segments three,
And gazing on thy column too, my heart goes out to thee.

N. A. WAKEFIELD.

NATIVE PLANTS' PRESERVATION GROUP

Local interest and help, including botanical information, is needed in the Wangaratta Warby Range district. Miss Nason, Kurringa-gai, South Wangaratta, is forming a local committee.

SPECIAL NOTICE TO COUNTRY MEMBERS

If you intend visiting Melbourne you are invited to attend our excursions, either motor coach or intra-metropolitan.

A letter addressed to me, Botanic Gardens, South Yarra, S.E.1, giving details of which excursions you desire to attend, and indicating your natural history interests, will receive immediate attention.

K. ATRING, Excursion Secretary.

A NEW SPECIES OF VICTORIAN MOSS

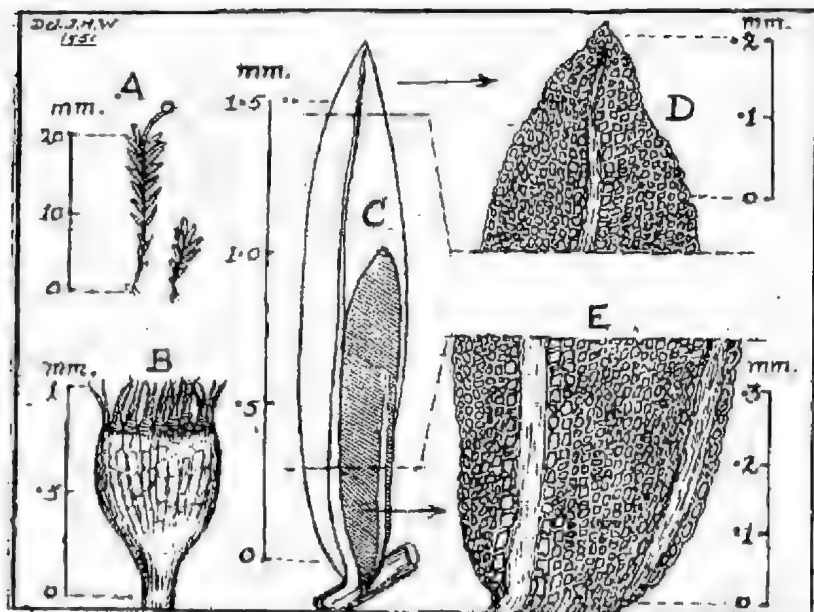
By J. H. WILLIS, National Herbarium, South Yarra

FISSIDENS HUNTERI, sp. nov. (Section *Semimbidium*).

Plantae graciles, gregariae vel laxe caespitosae, solo humid^o ripari^{is} fluviorum crescens (extra Victoriam/orientalem ignotae). Frons 5-25 mm. longa, foliis laxe plurijugis superne confertioribus.

Folia anguste elliptica, $1.2 \times .3-.5$ mm., late acuta; lamina vaginans paullo supra medium folium attingens, limbata in foliis supremis paucis; lamina dorsalis immarginata, ad basin valde angustata. Costa viridis, infra valida, sub apice soluta. Cellulae haud papilloae, translucentes, plus minusve subquadratae, circa 10 mic.; infra (prope costam) majores, usque ad 20 mic. Limbus hyalinus viridis, ad basin laminae vaginantis solo invenitur, versus marginem serie unica cellularum normalium.

Seta brevis, ca. 3-4 mm., rufescens. Theca erecta, profunde poculiformis, ca. .8 mm. longa, viride-brunnea, obscure tessellata. Peristomii dentes ca. 2 mm. longi, ferruginei, fimbriolati, in duobus segmentis filiformibus superne fissi, Operculum haud visum.



A. Typical plants (natural size); B. Capsule, showing short fimbriate peristome teeth; C. Upper leaf from a sterile plant, to show gross morphology; D. Leaf tip (much enlarged); E. Leaf base, enlarged to show cell structure and short border on the vaginant lamina.

Hab.: Far eastern Victoria, on the banks of Goommirk Creek (near "Gunmark" Rock)—a head-branch of the Delegete River—in wet subalpine forest at about 3500 ft. (Collector's note: "On

firm portions of the stream bank; with a slight coating of mud . . . could be taken as characteristic of such mountain streams.")

Leg.: W. Hunter, 6/4/1943 (No. 95, ex Herb. F. Robbins).

[TYPE in Herb. MEL., also in Herb. G. O. K. Sainsbury (No. 15, 546) and Herb. H. T. Clifford.]

Although none of the 25 species of *Fissidens* at present recorded from Victoria is known to occur in Europe, it may seem foolhardy to venture establishing any further "new species" in this already very large and puzzling genus, until the 700 (\pm) listed by Brothcrus in 1924 are critically revised—undoubtedly many of these would fall into synonymy. However, the section *Semilimbidium* is poorly represented in the Australasian region, and the proposed new plant differs markedly from any of those few species which have been described therefrom.

The collector, Mr. W. Hunter, after whom I have named the present novelty, forwarded all his material and precise field notes to Mr. F. Robbins (then of Castlemaine), who in turn, being unable to identify it, sent examples to Mr. G. O. K. Sainsbury (New Zealand's moss authority). Sainsbury also failed to recognize the species and sought an opinion from Mr. E. B. Bartram, the eminent world bryologist (in Pennsylvania, U.S.A.). Bartram replied as follows:

15546—As far as my knowledge goes, this is a new and quite distinct species in the *Semilimbidium* group. It certainly has no connection with *F. cairnensis* Broth and Watts, which, with *F. vittatus* Hk. f. and W., are the only two species in this group recorded from Australia. This section normally has the leaf cells papillose and rather obscure, whilst here the cells are smooth and pellucid. This character, along with the bluntly pointed leaves, seems to mark the species quite distinctly.

While *F. hunteri* differs from the southern Australian *F. vittatus* (with long seta) and minute North Queensland *F. cairnensis* in its clear, non-papillose leaf-cells, it also differs manifestly from the non-papillose Papuan *F. pungentissimus* Dixon (1942) in having bluish (not very long-acuminate) leaves and pellucid cells. Mr. Sainsbury recently placed material at my disposal, suggesting that I prepare and publish a description of this new Victorian moss. It is only to be expected that the species will ultimately be found across the New South Wales border (about 10 miles north-east) and also in other parts of Victoria.

It is deemed unnecessary to give an English version of the above Latin diagnosis, because the accompanying drawing (to scale) tell all that is needed to distinguish *F. hunteri* from its allies. Later, I hope to publish some account of the genus *Fissidens* as represented in this State, with synonymy and a key to facilitate identification of the various species.

**CENSUS OF BUTTERFLY SPECIES KNOWN IN THE TEXAS DISTRICT,
QUEENSLAND (TO OCTOBER 1950)**

By R. A. HUNT, Texas State School, Queensland

This census covers thirty-nine species of butterflies found in Texas district on the Queensland side of the Dumaresq River about sixty miles east from Coondiwindi. The list would never have been compiled had it not been for the unfailing interest and co-operation of the children of the Texas State School. I would like to mention here those children in particular, who, by supplying specimens, host plant records or other information, have helped considerably in the compilation of this article: Jack Beard, Bert and Bob Hart, Joan and Bob Rosetta, Barry and John Rigney, Norman Cameron, Clive Collins, Ray Potter, Bill Holman, Graham and Carmen Kelly, Rex Koina, James and Dion Danalis, and Barry Baker.

Swallow-tails (Papilionidae)

The Texas area can claim only three representatives of this arresting family. The Orchard Butterfly (*Papilio aegerus aegerus*) is usually abroad in fair numbers from about October to April. The adults show much variation in size.

The Chequered Swallow-tail (*Papilio demoleus sthenelus*) is by no means a common butterfly, but a few may be observed during the summer and autumn months. At one time they did not seem to go far from their host plants, but recently several were observed flying in an east to south-east direction. They were not flying together, but all passed within a fairly short period so as to suggest migration.

The Dingy Swallow-tail (*Papilio anactus*) is found in numbers only during the spring, summer and early autumn. They are fairly common, though not as numerous as the Orchard Butterfly. The main hosts for these Swallow-tails seem to be cultivated citrus plants, but the larvae of all three have been observed on the Native Orange (*Microcitrus australis*). The larvae of the Chequered Swallow-tail have also shown a liking for the Wild Salvia. All three species seem very prone to parasitization by a small black wasp which we believe to be some species of Chalcid. Here, many of these butterflies emerge after a winter in pupation.

Whites and Yellows (Pieridae)

These include twelve of our recorded species. The Wood White (*Delias aganippe*) is one of our rarest. The first specimen recorded was in 1948, emerging from a pupa found near mistletoe. One was collected in 1949, but none since.

The Northern Jezabel (*D. argenthona argenthona*) is seen mainly during mid-summer here. They are high fliers and rather difficult to capture. These are smaller than the coastal specimens. The local common mistletoe is their host plant.

The Common Jezabel (*D. migrina*) is also found upon mistletoe. The first of these was taken in the Pinnacle area, some twenty miles towards Tenterfield. This Jezabel is also a high flier.

The Nysa Jezabel (*D. nysa nysa*) is very rare; only two specimens have ever been captured here, the first during the 1948-49 season. So far we know nothing of its life history in this area or its host plant. Possibly mistletoe supports the larval stage.

The Common Migrant (*Catopsilia pyranthe*) is always well represented during summer months, appearing to gather in the areas of Cassia along

gullies and the lighter timber nearby, *Cassia* being the known host plant. I have never seen these in mass-migration about here.

The Lemon Migrant (*C. pomona pomona*) is often seen in company with the former, having *Cassia* also as its host.

The Caper White (*Anaphæsis jawa tentonia*) is certainly one of the commonest of all our local species. The host plant, *Capparis*, or "Bumble-bush", is here in large stands, and, during the summer, hardly a bush is free of Caper larvae. Some seasons see the pupae practically covering bushes. They were especially common during the summers of 1940-41 and 1948/49. At these times they would migrate in dense numbers towards the south-east for several days. In cases where the foliage of the *Capparis* was insufficient to support the full colony, many of the larvae pupated prematurely, resulting in many stunted adults. Many pupae were eaten by stinging larvae. The 1949/50 season brought strong parasitization by Chalcid Wasps. Eggs of the Caper White were observed on *Capparis* as late as February 1950, and in April 1950 several small larvae were found on one bush. The earliest eggs this summer were seen in mid-October.

The Narrow-winged Pearl White (*Elodina podusa*) was first listed for Texas during Christmas 1949. In February 1950 fair numbers were noted. Recently, a female resulted from a larva collected on a slender species of *Capparis*.

The Chalk White (*E. pothia*), so far found only in the Pinnacle area among the *Capparis*, by far out-numbers the Caper White in that region.

Last October the Common Albatross (*Appias paulina ega*) was collected near Boushew, about fifteen miles up-river from Texas, on the N.S.W. side. So far we know nothing of its life history, nor of the plant upon which its larvae feed.

The Common Grass Yellow (*Terias hercabe sulphurata*) is usually in large numbers during spring and early summer. The numbers wane towards mid and late summer, while occasional specimens are seen in early autumn. They share *Cassia* as host with the Migrants.

The Small Grass Yellow (*Terias similax*) is actually more common than the former species of Texas, its host plant and period of occurrence being the same.

Nymphs (Nymphalidae)

Seven species comprise the local Nymphs. The Glasswing (*Acraea autographa*) is, as a rule, well-represented each season, especially during the summer of 1948/49, when larvae, pupae and eggs in great numbers were reported in practically all the known local Wild Passion-fruit vines (*Passiflora alba*). They are observed as late as April in some seasons when the autumn is a warm one.

The Common Egg-fly (*Hypolimnas bolina neringa*), known locally as the "blue-dot", is usually prevalent, especially during the late summer and autumn. In late March, many pupae are observed hanging under logs, etc., close by the host plant (*Sida rhombifolia*). Another plant, the Prostrate Smart-weed (*Polygonum prostratum*), was recorded last summer as a second host for this species. The larvae, being nocturnal feeders, are rarely seen. Two interesting variations, both females, have been collected—the white patches of fore and hind wings hardly discernible.

The Meadow Argus (*Prexis vilhda calybe*) is always common during the warm months in any open grassland areas. Rarely have we seen this butterfly amongst timber. The Wild Verbena or "Blue Weed" (*Verbena venosa*) is fairly plentiful here and explains the large numbers of the Meadow Argus.

The Painted Lady (*Pyrausis cardui keeshawii*), relying on Cape Weed as host, has not been a common species until this year. During late October

1950 they were observed in much larger numbers than at any previous season and usually kept to open places.

The Australian Admiral (*Pyronia itea*) is here in greater numbers than the Painted Lady, doubtless owing to the prevalence of host plants (Stinging Nettles). We have observed pupae both on the host and away from it. This butterfly became really common during the 1948/50 season and again during 1950/51.

The Tailed Emperor (*Eriopa pyralis sempronius*) is rare. Up to April 1950 only one pupa was found, and that away from the host plant. A larva collected on Kurrajong during the same month pupated and emerged a perfect insect. The butterfly is rarely seen here despite the fact that its host tree is common. Our first specimen was recorded during the 1947/48 season.

The Danaid Egg-fly (*Hypolimnas misippus*) or "Lesser Blue Dot" is known here by one specimen only. It was a female collected on 12 February 1950. Insufficient observation and lack of specimens cause its host plant to be unidentified at present.

Danaids (Danaidae)

Only four species recorded for here. The Monarch Wanderer (*Danainus plexippus*) is not as common as in the coastal areas, probably owing to the fact that its host is not a plant frequently met in this part. The two introduced Milky Cotton bushes of the *Hoya* family, *Asclepius curassavica* and *Gomphocarpus brasiliensis*, are the only host plants known in this area. The former, a rather low bush with red and yellow flowers, grows in fertile pockets along river banks, and the latter—a taller plant with mauve and cream flowers—sometimes known as the "Swan Plant"—is grown in some gardens, but does not occur wild.

The Lesser Wanderer (*Danaida chrysippus patilia*) shares the same hosts as *D. plexippus*, but being much more common, suggests another plant supplying larval food but not yet identified.

The Blue Tiger (*Danaida melissa hamata*) was first captured in the early 1949/50 season. Its host plant is not known here yet, and, because this migrant did not appear again during 1950, there has been no opportunity to find out. Early summer seems to be its optimum period, but it had disappeared by early autumn.

The Common Crow (*Euploea core corinna*) was one of our commonest species during the 1947/48 season; however, due to parasitisation by the wasps, the next season saw much fewer numbers and they have not been abundant here since. The commonest host plant for the Crow is garden-grown Oleander. Larvae have been noted also on Monkey Vine, so possibly this plant is one of the natural hosts. One pupa was found on a Moreton Bay Fig, well away from either of these two known hosts—perhaps the fig tree too is a host.

Blues, Coppers and Hairstreaks (Lycaenidae)

This family has nine recorded species here. The Grass Blue (*Zincaria labradus labradus*) is particularly common about lucerne paddocks in flower. Any open country with low, flowering herbage is favoured as a gathering place for these butterflies. Lucerne, clover and another small lucerne-like plant are local hosts for the Grass Blue.

The Dark Grass Blue (*Z. lysimachia karsmacha*) finds Bull's Head Burr a suitable host plant, and is plentiful here. The adults are easily caught on flowers of the burr (*Tribulus terrestris*) and adjacent flowering plants.

The Imperial Blue (*Idmenis evagoras evagoras*) has been observed only three times so far. One was caught during the 1948/49 season and two during 1949/50—one as late as March 19, in scrubby acacia and cypress country.

The Fringed Blue (*Neotuma agricola agricola*) is fairly common in spring-time and early summer when its larvae feed chiefly on the flower buds of pea-like plants and lucerne.

The Small Copper (*Lucia buxus*) was not noted here before the 1949/50 season. They have made their appearance in large numbers along the river flats this October.

The Speckled Line Blue (*Mucaduba ancyra florinda*) is common during our summers. Peach-leaf Poison Bush (*Trema aspera*), host of this butterfly, is often seen growing among or near nettles here.

The Satin Azure (*Ogyris amaryllis lewintsoni*) has been noted only once, and that during the 1948/49 season. It had apparently just emerged from pupation, and was on the ground under a clump of mistletoe.

The Amaryllis Azure (*Ogyris amaryllis amaryllis*) is represented by only one specimen—a female freshly emerged, and also near a mistletoe.

The Yellow-Spot Blue (*Candalides xanthaspilus*) so far has not been found beyond one area—a rocky granite hill near Mundooey, about eight miles distant. We do not know yet the local host plant. I have caught this species in sandy Walluin country north from Neosa Heads, Q., but the two tracts of country bear little relationship to each other botanically.

Bracons (Satyridae)

These are poorly represented here, having only three species. The Common Brown (*Heliconiopsis merape merape*) may be met with in open grassy country, timbered creeks and lightly timbered grasslands. The males emerge much earlier than do the females and were observed on October 1, while the first female (newly emerged) was noted on October 27. Certain grasses are the host plants.

The Brown Ringlet (*Hypocysta metinus*) was first observed during Christmas 1949, when they were fairly abundant in grassy country shaded by river gums. They were noted later on a grassy iron-bark ridge. Like the Common Brown, they have grasses as the host. During Easter 1950 they were the commonest butterflies in the Pinnacle area.

The Dingy Ringlet (*Hypocysta pseudirius*) has been recorded only once (during the 1947/48 season).

Skippers and Darters (Hesperiidae)

This family is represented by one species found in April 1950, viz. the Common Dart (*Padraona hesperia hesperia*), which lives upon local grasses. They reappeared during early October 1950 in fair numbers along creek banks. A skipper is known to be in the district, but has so far eluded capture.

Introduced Species

The Cabbage White (*Pieris rapae*) is proving a menace to cabbages and cauliflowers in the town area and is increasing rapidly. We have not noted any indigenous plant being used as host.

AFTERMATH OF SNOW AT SHERBROOKE

A visit to Sherbrooke two weeks after the recent "big freeze" and record snowfall (July 1951) showed the devastation caused to vegetation not adapted for such conditions.

The whole floor of the forest was littered with leaves and large branches (some of considerable size) broken from the Mountain Ash, Wattles and other trees. With many of the saplings, the crown was on the ground and the slender trunks split and broken.

Tree ferns were bowed symmetrically so that the ends of the long fronds touched the ground—the whole resembling partly opened umbrellas—and the bracken was flattened and splashed with brown.

As the snow was widespread over the State, the total damage must have been considerable.

—1.M.W.

EXCURSION TO PAYNESVILLE

BIRDS

We saw a variety of birds at the Gipsland Lakes on March 10-12, 1951.

As we waited for our launch at Paynesville, Silver and Pacific gulls squabbled for titbits near the fish shed. Watching them was a dark brown-black bird, probably an immature Pacific Gull. Presently he swooped down on a gull that had an extra big helping of fish and chased it over the strait, thus getting a meal.

The shag, as Professor Wood-Jones says ("Sea Birds Simplified") "exercises all his wit to find a handy place on which to sit." Every harbour pile and buoy on our voyages carried a shag. Shags and mullet go together, and the fish are plentiful in the Lakes. Mostly they were the Little Black and the Pied Cormorant. Again the Professor, "And please remember that despite the name, the Cormorant and Shag are just the same."

We landed at Ocean Grange for a look at the Ninety-Mile Beach, and near the lunch camp a party of the Rainbow Lorikeets were enjoying the Coastal Banksia trees. We saw a Nankeen Kestrel and some Wattle-birds and heard a Grey Butcher-bird. A dog showed us a Ring-tailed Possum, long dead, hanging by its tail to the small branches of a tree.

Later, at Sperrin Whale Head National Park, we did not see as many birds as we expected—dry country in a dry season. We flushed a Brown Quail and saw some Musk Lorikeets in gum blossom. Mr. Barton, the ranger, told us of emus with chicks, but he had not actually found their nests.

Members were very interested in the dotterels' way of stirring up insects in the sand, slipping their long toes just under the surface, ditch hoe method, apparently very successfully.

There were numbers of Spur-winged Plovers about the swamps and open country. Are they increasing or have I just noticed them more in recent years?

During Sunday's trip to Sandy Point and Raymond Island, we saw Teal, Black and Mountain Ducks, White-faced and White-necked Herons and many Black Swans. Oh, the Black Swans lifting from the lake near Sandy Point! We missed the real highlight of this trip; time, the enemy of bird observing, forbade us crossing to search the isles near Ocean Grange, where Mr. Barton says the Ground Parrot is definitely to be found. They have been seen also on Raymond Island in recent years. He told us of a pair of White-breasted Sea Eagles nesting for years at Rotterdam Island, but he has not seen them in the last few years. How often does the story end this way? When can we go and see the bright green Ground Parrots just to make sure?

M. E. L. M.

PLANTS

From the botanical point of view the highlight of this trip was the visit to the 3,500-acre Lakes National Park. This area, though small in size, is impressive, and should receive more attention and study than it does from club members.

Unfortunately our stay was a very brief one, so it was not possible to identify and name all the extensive range of plants observed, especially when not in flower. However, three species deserve special mention:

1. var. *canescens* of Golden Grevillea (*G. chrysophylla*).
2. Mahogany Gum (*Euc. botryoides*).
3. *Thryptomena miqueliana*, which was growing in profusion.

An interesting feature on one hill was that under a thin layer of top soil was pure beach sand; this was surprising seeing the heavy cover it was carrying (? reclaimed sand dune).

Raymond Island, with its array of holiday shacks, was an uninspiring sight viewed from Paynesville, but further investigation revealed another story. This once well cultivated island was long ago abandoned and is now revert-

ing back to its natural state. Very flat and low, it carries a heavy cover including Manna Gum and Mahogany, also a large amount of Wedding Bush (*Reinocarpus pinifolius*); leptospermum and melaleuca were also abundant. The Committee of Management have arranged for school children to plant native trees on this island. Each child tends his own tree and watches it grow and develop.

By way of showing what Raymond Island soil can do, the party made a call on one resident who is doing experimental vegetable and fruit growing. With onions averaging a pound in weight and everything else on a similar scale the results were astonishing. (And so would be the odour in one or two suit-cases at the finish of the trip!) —A.J.

MELBOURNE'S MANGROVES

(To the Editor)

Sir,—With reference to the note published in your journal (Feb. 1951) by Mr. J. H. Willis and entitled "Melbourne's Mangroves Are Dead?" the following may be of interest.

In July 1950 several members of the staff of this Department visited the Williamstown Salt Marsh and found that all the seedling mangroves of the area had been recently killed. On the surface of the water in the pools and on the vegetation of the small channels in and along which the young mangroves commonly occurred, there was present a thick scum of some heavy mineral oil which appeared to have been carried there by a very high tide and left behind at the ebb.

Shortly before our visit there had been a spell of very wet and rough weather with strong south-westerly winds. If I remember correctly, there had been about this time, too, some newspaper comment deploring the common practice of ships dumping waste oil in the Bay. As we also found a deposit of oil along a high tide mark on the beach which bounds the marsh on the seaward side, we assumed without further inquiry that the oil had come from a ship and, being washed inshore, had been driven through the mouth of the creek and spread out over the marsh as the waters backed up under the influence of the wind.

At the time all the larger mangroves appeared to be healthy and vigorous, but I remember wondering what the effect of a coating of oil on the surface of the pneumatophores would be. Mr. Willis' report of the death of the adult trees seems to provide the answer.—Yours etc.,

STELLA G. M. FAWCETT,
Botany Dept., University of Melbourne.

CLIMBING PLANTS

(To the Editor)

Sir,—During the last few months some observations have been under way here regarding the direction in which twining plants turn. This query originally arose from an English friend of Professor Cleland, who requested information regarding the way in which certain English climbers turn in the Southern Hemisphere.

Professor Cleland has made several interesting observations and a brief note will appear shortly in the *S.A. Naturalist*. As there appears to be very little information available on the subject, especially relating to Australian climbing plants, I therefore thought it might be of interest to seek the assistance and opinions of members of the Victorian Club. If anybody has any observations to record I shall be pleased to hear from them.—Yours etc.,

T. R. N. LOTHIAN,
Director, Botanic Gardens, Adelaide.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, September 10, 1951. The President, Mr. E. E. Lord, was in the chair and about 100 members and friends attended.

The following were elected and welcomed to the Club: as Ordinary Members, Messrs. G. R. Ricarby and R. A. Cromb.

The President announced that a letter had been received from the National Museum asking for representatives to attend a meeting to discuss the selection of a floral emblem for the State. The Secretary, Mr. F. Lewis, and Mr. H. Stewart were appointed.

The announced speaker, Mr. Charles Brazenor, had been unexpectedly called to Queensland, and Mr. Donald Tugby lectured in his stead on "Understanding the Australian Aborigine." A very sympathetic and interesting description was given of their family life, their customs and their initiation ceremonies, illustrated with films and some unique records of their ritual songs.

A vote of thanks was moved by Mr. H. Stewart and seconded by Miss Wigan.

EXHIBITS

FLOWERS, Etc.: Large variety of native flowers, garden grown—Mr. I. Hammett.

Dipidax triquetra, also known as *Melanthium triquetrum*—Order Siliceae, native to South Africa. Garden grown at Hawthorn East.—Miss E. Raff.

Ghost succulent (white) and *Teschneria multicaulis* (red)—Mr. H. Haase.

PHOTOS.: *Hakea* wattle and other native flora, taken on Bendigo excursion—Mr. R. D. Lee.

ORCHIDS: *Cymbidium hookerianum* and *Dendrobium speciosum*. Latter specimen taken from Mt. Genoa about twenty years ago while on a trip to Mallacoota with Mr. Charles Barrett. It has flowered quite a number of times, is grown under a bottle-tree and is taken into a glass house when about to flower.—Mr. V. Miller.

EUCALYPTS: Ooldea Mallee (*Eucalyptus pyriformis*). Seed pods of Weeping Gum (*Eu. sepulcralis*), Bell-Fruit Mallee (*Eu. preissiana*), and Rose-of-the-West (*Eu. macrocarpa rosea*), the seed pods of which may be up to 4 inches in diameter.—Mr. A. E. Brooks.

NEST: Pigeon nest from a ledge of the Melbourne Town Hall—Mr. H. Haase.

NEW BEES AND WASPS — PART XVI

Primitive Wasps

By TARLTON RAYMENT, F.R.Z.S.

Introduction

The archaic wasps in the Family ORUSSIDAE present several very remarkable morphological structures, and since little information is available in the textbooks, the author has given more prominence to the subject than he would otherwise have done.

Inms (1924) regards the wasps as relics of an ancient group, distributed widely over the world, but nowhere very plentiful, either in species or in numbers, and the same author gives only one species for Europe, *Orussus abietinus* Scop., which is very distinctive with a ferruginous abdomen. *O. sayi* Westw. is said to resemble this species very closely, and Harrington (1913) says the two may be identical.

The median plate behind the metathorax is divided longitudinally in SIRICIDAE, but undivided in ORUSSIDAE. Rohwer and Cushman (1917) proposed the Suborder IDIOGASTRA, falling between SYMPHYTA and APOCRITA, but Inms retains the wasps in SYMPHYTA because of the broad waist.

The former authors describe the larvae of *O. abietinus*, and they established the parasitic character of the wasps, but as there is little published information on the habits of the Australian species, Norman Rodd's observations on the habits of the new species is a welcome contribution to our knowledge of the Orussids. *O. occidentalis* is said to be parasitic on the larvae of Buprestid beetles.

McKeon (1924) says only two species of *Oryssus* have been described from Australia, and both are exceedingly rare in collections. *G. queenslandensis* (Turn.) is a beautiful black and gold species, distributed from Mackay in Queensland to Dorrigo in New South Wales, and Rodd's record extends the habitat still farther south to Fraser Park, south of Newcastle. The larva is almost certainly parasitic on wood-boring beetles, but details of the biology are not known.

Froggatt records that a single genus, *Oryssus*, is present in Australia. Tillyard (1926), however, says the ORYSSIDAE is represented in Australia by a single genus, *Ophrynopus*, of which *O. sericatus* Moes. is found in North Queensland, while the closely allied *O. schauinslandi* Ashm. occurs sparingly in New Zealand and the Chatham Islands. The larvae are parasitic on wood-boring beetles.

At Upwey, Victoria, the well-known coleopterist, F. Erasmus Wilson, found numerous larvae of the Buprestid beetle, *Melobasis purpurascens*, in the trunk of an old specimen of wattle, *Acacia vernicifolia*, on which he collected the genotype of *Orussobatus wilsoni* Benson.

The author is indebted to the courtesy of Mr. Wilson for the opportunity to study the Holotype, Paratype and Allotype respectively of *O. wilsoni* Bens., *O. minutus* Bens., and *O. mesembrius* Bens.

Although Turner published the name *O. queenslandensis*, and Froggatt prints *O. queenslandicus*, I cannot discover which author effected the change.

No specimen of *O. maculipennis* was available for study, although Mocsáry gives "New South Wales" as the habitat, and Tillyard says it is found in North Queensland.

The depiction of the morphology of the two wasps was simplified by the loan of a number of mounts prepared by Norman W. Rodd, and his assistance was sincerely appreciated by the author.

The author is indebted to Keith McKeown, of the Australian Museum, Sydney, for a copy of Mocsáry's description of *O. sericatus*. Mocsáry (1900) regarded *Ophrynopus* as a subgenus of *Orussus*, but the characters are sufficient to warrant full generic rank.

Mr. McKeown says (in lit.): "Several years ago I tried to trace the Froggatt specimen, but without success, and it seems to have disappeared, and the first reference to *O. queenslandicus* that I can find is in Froggatt's work."

I am indebted to the courtesy of Alex. W. Burns, of the National Museum, Melbourne, for the loan of a specimen of *G. queenslandensis*, and assistance in checking some of the references.

Henson (1938) published a good paper* which added two new genera to the insect fauna of Australia, and his 27 diagrams of the scutella, femora, antennae, and clypeal carinae will assist the student of the Family to separate the several genera.

The literature is therefore not without difficulties for the student of the Hymenoptera, and the confusion may be due to the paucity of specimens available for study. The author, therefore, deems it advisable to attempt a clarification of the position.

The author's researches in the HYMENOPTERA are assisted by a grant from the Trustees of the Commonwealth Science and Industry Endowment Fund, and the author desires to record his appreciation of the support accorded to his research by the Chairman of the Fund, Sir David Rivett.

CENSUS and DISTRIBUTION

Konow (1897) proposed the genus *Ophrynopus* for six species, which are distributed as follows:

<i>O. andrei</i> Konow	Brazil, South America.
<i>O. batesianus</i> Westw.	Amazon, South America.
<i>O. subaustignus</i> Westw.	Aru Island, South Pacific.

*There is a slight error in the citation of this paper in the *Zoological Record* for 1938; it should read—Series II, Number 7.

<i>O. maculipennis</i> Sm.	Aru Island, South Pacific.
<i>O. mexicanus</i> Cress.	Mexico, Central America.
<i>O. sericatus</i> Moes.	New South Wales, Australia.

In the genus *Oryssus* Latr., Konow lists ten species:

<i>O. abietinus</i> Scop.	Europe.
<i>O. affinis</i> Harris.	America.
<i>O. amazonicus</i> Westw.	Amazon, South America.
<i>O. loriae</i> Mantero.	New Guinea, South Pacific.
<i>O. nigricans</i> Cam.	Central America.
<i>O. occidentalis</i> Cress.	America.
<i>O. sayi</i> Westw.	America.
<i>O. terminalis</i> Newm.	America.
<i>O. thoracicus</i> Ashm.	America.
<i>O. unicolor</i> Latr.	Europe.

Dalla Torre includes in his Register for *Orussus* the following additional species:

<i>O. dentifrons</i> Phil.	Chile, South America.
<i>O. imperialis</i> Westw.	Gold Coast, Africa.
<i>O. planicornis</i> Guer.	Abysinia, Africa.

The Australian species are recorded from the following localities:

<i>Gniglia bambycinus</i> (genotype)	Kuranda, Queensland.
<i>O. mesembrinus</i> Bens.	Bogan River, New South Wales.
(taken on <i>Acacia pendula</i>)	
<i>O. minutus</i> Bens.	Bogan River, New South Wales.
<i>O. normani</i> Rayment	Lane Cove, New South Wales.
<i>G. queenslandensis</i> (Turn.)	Mackay, Queensland.
Dorrigo, Fraser Park, the subspecies <i>coronatus</i> ;	
Lane Cove, Narooma, N.S.W.	
<i>O. wilsoni</i> Bens. (genotype)	Upwey, Victoria.
<i>O. sericatus</i> (Moes.)	North Queensland.

The several insects may be separated by the following key:

- | | |
|--|--|
| Large insects (females) | 1 |
| Small insects | 3 |
| 1. Three carinae on mesonotum | <i>G. queenslandensis</i>
and subsp. <i>coronatus</i> |
| No such carinae | 2 |
| 2. Tergites without golden maculae | <i>O. mesembrinus</i> |
| Anterior margin of supra-antennal carina depressed | 3 |
| 3. Pterostigma amber | <i>O. wilsoni</i> |
| Anterior margin not depressed | 4 |
| 4. Pterostigma blackish | <i>O. normani</i> |
| Radius obsolete, tegulae amber | 5 |
| 5. Longitudinal rugae of tergites fine | <i>O. minutus</i> |
| Larger, longitudinal rugae coarse | 6 |
| 6. Radius strong, tegulae black | <i>O. normani</i> |
| Ten nodes in two lines on frons | 7 |
| 7. Carina of metathorax conspicuous | <i>O. sericatus</i> |
| Some reddish colour about the scutellum | 8 |
| 8. White or ivory on the hind tibiae | <i>G. bambycinus</i> |

TAXONOMY

Order Hymenoptera

Suborder CHALASTROGAstra

Superfamily TENTHEREDINOIDEA

Family ORUSSIDAE

Genus *Orussus* Latr.

(Préc. Car. génér. Insects, p. 111, 1834.)

Genus *Ophrynopus* Konow

(Term. Füz., Vol. xxiii, p. 605, 1897.)

Genus *Orussobainus* Benson

(Ann. Mag. Nat. His., Vol. II, Ser. II, No. 7, p. 8, 1938.)

Genus *Guiglia* Benson

(Ann. Mag. Nat. His., Vol. II, Ser. II, No. 7, p. 11, 1938.)

Benson separated the several genera by the structure of the frontal and clypeal carinae, the sub-apical segment of the female antenna, femur and tibia, and tibial spurs, the scutellum, pterostigma, and the adjacent nervures, all of which present stable characters.

On his diagnosis, *O. queenslandensis* Turn. is referred to *Guiglia*, and he believes that *O. sericatus* Mocsáry and *O. schauinslandi* Ashmead should almost certainly be separated from *Orussus*. Benson states that R. E. Turner assumed that his wasp from Kuranda was the same species as that collected by his brother, G. Turner, *O. queenslandensis*, but Benson had to erect the genus *Guiglia* for R. E. Turner's wasp, *G. hambycinis*.

The material before me raises the question of the identification of *O. sericatus*, for, as Benson observes, Mocsáry's description will fit several of the wasps; and as the type does not appear to be available for comparison now, it is possible one of the other species described may be synonymous with it.

However, the wasps show variation as they extend farther south, and the present author believes with his collector, Norman Rodd, that the Orussids are not so rare as has hitherto been believed, and the number of known species will be increased in the future as the insects become more familiar to collectors.

It is of interest to students of evolution and comparative morphology to find that the asymmetrical hind tibial spurs of *Ophrynopus* and *Stiricorsia* Konow have a homologous parallel in the Victorian wild-bees *Goniocolletes* Ckll. The spurs are more nearly equal in the genus *Orussobainus*.

Unfortunately, the papers by Bischoff, H., 1926, Buysson, R. Du., 1911, and Guiglia, D., 1935, all referred to by Benson in his paper, were not available to the author.

The Fraser Park specimens are not typical *G. queenslandensis* and are entitled to subspecific rank at least, and the author proposes the name *coronatus* for the New South Wales insects, and appends the specific description.

A specimen which was collected at Bushley, Queensland, on November 15, 1924, by A. N. Burns, proved to be the largest female of typical *G. queenslandensis* studied by the author. The carina of the plate apical of the metathorax is coarsely punctured (finely tessellate in the subspecies); and the two carinae of the supra-antennal area reach the anterior margin (shorter in the subspecies).

It differs from the subspecies by the pubescence extending entirely over the two apical tergites in a beautiful golden iridescence; the carinae of the apical sternites are smaller, with a different sculpture.

The fifteen spiculae of the hind tibiae are much stronger and blacker than the twelve of the subspecies, and the suture of the anterior tibiae is very different; not so well developed. The subspecies *coronatus* is to *queenslandensis* what *minutus* is to *normani*.

Rohwer and Gahan figure the ovipositor of *Orussus abietinus* not only coiled inside the abdomen, but extending into the mesothorax in a series of small irregular loops. Rodd sent the author a drawing from a preparation, and this shows the ovipositor of *G. queenslandensis coronatus* within the abdominal cavity as a single coil, but without any trace of the mesothoracic loops. It seems better to refer all the Australian species to *Orussobains* Benson and *Guiglia* Benson.

(To be continued.)

(Detailed descriptions will appear next issue.)

JUNIOR FIELD NATURALISTS

The Hawthorn Junior Field Naturalists Club celebrated its 8th birthday on August 31. Mr. A. A. Baker occupied the chair, and before commencing the business of the evening welcomed the Mayor (Councillor George) and Lady Mayoress, the guests of the evening, introduced Miss Ina Watson, a Past President of the F.N.C.V., and warmly congratulated Mrs. Freame whose untiring enthusiasm and hard work is largely responsible for the success of the Club. Susan Fisch picked wild flowers from the home garden, made them into delightful bunches, and presented one each to the Lady Mayoress, Mrs. M. E. Freame and the lecturer.

Miss Ina Watson gave an illustrated address on Skokholm Island and greatly interested the meeting on the banding of English sea birds, connecting it with the present banding of the Silver Gulls at Altona.

The usual many fine exhibits were on the table, and the exhibitors (all junior members, the youngest aged six years) gave their own description of them.

At the end of the meeting refreshments, provided by the parents and friends, were very much enjoyed by the 105 present.

The Mayor, whose council has helped the Club in every way, was greatly impressed by the work done, and especially by the deportment of its junior members.

M. L. WIGAN.

**NOTES ON SOME EASTERN VICTORIAN BUTTERFLIES,
WITH A NEW VICTORIAN RECORD**

By D. F. CROSBY, A.E.S.

INTRODUCTION AND DISCUSSION

Till the present time the extreme east of Victoria has been more or less neglected from an entomological point of view. Of recent years the most notable excursions to this district have been by Burns,⁽¹⁾ and Burns and Wilson in early 1946 and 1947 respectively. Previously Wilson (Burns¹) had recorded for the first time (1935) the presence of *Ypthima arctous* Fab. near Nowa Nowa. Following these important visits the author made two trips to the district, the first in January, 1948, and the second in February, 1949, with J. M. Landy. These notes are compiled from the observations and captures of these two trips.

It is a significant fact that in the coastal belt the present range of *Hesperilla picta* Leach, *Ypthima arctous* Fab., *Candalides xanthospilus* Hub. and *Toxidia peroni* Latr. ends sharply at the Lakes Entrance district. West of this area the country becomes flatter and comparatively drier and the fact that it is now cleared to a great extent would tend to limit further western extension in their range. The above species are all common in New South Wales and have most probably gradually extended their range into Victoria. Present records indicate that in Victoria they are almost wholly confined to the coastal belt and as such it would seem that they have merely moved south along the coast. However, odd specimens of two of the above species have been taken in the mountains of northern Gippsland—a specimen of *Y. arctous* was taken by Wilson at Lightning Ck., Vic., in March, 1951, and a single male of *T. peroni* was caught in January, 1947, by Landy on the Howqua River a few miles east of the Jamieson-Mansfield road. The most probable explanation of these two captures is that their predecessors came west through the mountains of central southern New South Wales to those of central eastern Victoria. There is much interesting work, especially from the point of distribution, yet to be done in the latter mountain area.

***Ypthima arctous* Fab. 1775**

At Nowa Nowa a single specimen of this species was taken about half a mile south-west of the town in a sunny, grassy place beside the main road. Despite a diligent search, no more specimens could be located in the vicinity, but at Tostaree, about six miles east of Nowa Nowa, a good patch was found and many specimens were seen. As has been noted by Burns,⁽¹⁾ Victorian specimens show no differences when compared with Sydney and Cairns (Queensland) specimens. A small series of specimens was taken, including two females.

Like most nymphalids, this species prefers bright sunlight clearings that occur amongst gums and wattles commonly beside roads. This small dark species is rather difficult to follow on the wing and not very interesting from an aesthetic point of view, but is of considerable interest because of its geographical distribution, as has been mentioned above.

Other than at Tostaree and Nowa Nowa no further specimens could be found, in spite of a long search between that locality and Eden, N.S.W. However, this is probably because it is very local, and there seems little doubt that it will be found eventually on the coast round Mallacoota.

Heteronympha paradelpha paradelpha Lower, 1893

It was of interest to note the abundance of this beautiful large satyrid from Nowa Nowa through to Mallacoota. At Cann River over 100 specimens were seen near the river in an hour, but as was to be expected at this time of the year (early February), there were very few females. It is a strange fact that with most butterflies of south-eastern Australia the males emerge earlier in the season than the females and this difference in time of emergence is most pronounced in the Satyridae, where in some cases there is little overlap in the flights of the two sexes.

Candalides xanthospilos Hübnér, 1806

Four male specimens of this species were taken on February 7 in a cleared patch near the main road about a quarter of a mile east of Nowa Nowa. These were in rather poor condition but nevertheless interesting to take, as the species is far from common in Victoria; most of the specimens caught in this State have come from near the Gippsland Lakes. Some four days later, however, at Mallacoota this species was to be seen in dozens only a few hundred yards south of the town. Here the species liked to fly in sheltered spots amongst the trees, especially in mid-afternoon, and although hard to see when on the wing, the specimens were in good condition and well worth the effort of capture. Odd ones were taken at Tostaree and Gipsy Point.

The larvae usually feed on a species of *Pimelia*, and although a small species similar to *P. humilis* was quite common where the insects were flying, a careful search failed to produce larvae or pupae.

Parabucia aenea aenea Miskin, 1890

Several dark male specimens of *P. aenea aenea* were taken at Nowa Nowa near a patch of their food-plant (*Bursaria spinosa*) growing by the creek. A number of females, which were more common than the males, was also taken. A series in the National Museum, Melbourne, and those taken on the trip show that all

the males appear dark, mainly because they almost completely lack the copper scales on the hindwing above found on more northern examples. The specimens from this locality represent the most southern extension of the range of the typical race of the species. It was the specimens caught here that lead ultimately to the describing of *P. acnea lucida* from the Greensborough-Eltham district.⁽²⁾

Hesperilla mastersi Waterhouse, 1900

The highlight of the second trip (February, 1949) undoubtedly was the capture of a female specimen of *H. mastersi* which was flying with *C. xanthospilos* and *T. peroni* (see below) a quarter of a mile south of Mallacoota. The most southerly record of this species prior to this was probably at Moruya, N.S.W., and thus this specimen may be recorded as being the first Victorian one. The fact that the specimen was in good condition indicates that it had bred nearby and there may possibly be a small colony in the area. Time did not permit a really thorough search of the vicinity, but there is a small amount of *Gahnia* growing in the locality for the larvae to feed on. Since this specimen was taken, F. E. Wilson took a perfect female at Merimbula, N.S.W., in early February, 1950. Apparently, then, the species occurs from Gosford, N.S.W., to eastern Victoria, and like *C. xanthospilos* and the following species has migrated down the coast, thereby almost doubling its range as previously recorded.⁽³⁾

Hesperilla picta Leach, 1814

The first encounter the author had with this species was in early January, 1948, when half a dozen bright yellow hesperid larvae were taken in a small gully near the side of the road about half mile from Gipsy Point. These were feeding on a species of sword-grass (*Gahnia melanocarpa*) and were practically full-grown, producing specimens of *H. picta* towards the end of February.

In mid-February of the following year a further examination of the locality produced a large patch of the sword-grass growing in a swampy gully in which many specimens of *H. picta* were to be seen on the wing. This skipper is rather hard to net because it flies very fast and rarely settles, so a search was made for pupae, which were ultimately found to be reasonably common. These pupae were in well disguised shelters, usually located in the outer part of the food-plant and composed normally of only two uneaten leaves. When searching for the pupae it was interesting to note that larvae of two distinct sizes were found. Some were very small, possibly only in their first or second instar, being not more than half an inch long, whilst the others were completely or very nearly full-grown. The small larvae died when transferred to a food-plant in the author's garden, so proof that they were actually *H. picta*

is lacking. Old shelters which may have indicated the presence of *Hesperilla donnysea* or *Oreisplanus perornatus* by their pupal shells and caps were also absent, so these small larvae may possibly indicate that an earlier brood of *H. picta* was on the wing some six to eight weeks earlier (i.e., late November or early December). Further north along the coast near Sydney the species is common in spring as well as in late summer.

At Nowa Nowa, near Lake Tyers, several specimens of *H. picta* were also taken. There were several patches of the food-plant at this locality, but the species was not nearly as common as at Gipsy Point. The species had been recorded in the two preceding years, (1946 and 1947) by Burns⁽¹⁾ from Lake Tyers and also at Wingan Inlet. Whereas at Gipsy Point the butterflies emerge at the beginning of February, they are not seen at Nowa Nowa till mid-February and are more common towards the end of that month. In the batch of pupae taken in 1949 from Gipsy Point a high percentage (approximately 40%) were parasitized by a small black Chalcid wasp—a gregarious internal parasite.

Toxidia peroni Latrielle, 1824

Flying with the *Candalides xanthospilos* were many specimens of the dull skipper *Toxidia peroni*. These, like the *Candalides*, were in fine condition, indicating recent emergence, but they seemed to prefer the sunnier spots in the coastal scrub rather than those of the nearby forest. Dozens of specimens were seen during the four-day stay at Mallacoota, and of those caught only a small percentage (approximately 15%) were females.

With regard to the genus *Toxidia* it was surprising to find that *T. parvula*, *T. doubledayi* and *T. andersoni*, together with the *T. peroni*, could all be caught at Mallacoota in one small patch of about two acres extent. However, the *T. peroni* were by far the most common.

GENERAL NOTES

Male and female specimens of the pretty skipper *Mesodina halyzia* Hewitson were taken commonly with *T. peroni* in the coastal scrub at Mallacoota. A small species of *Paterstonia* (*P. fragilis*?) was growing commonly in the area and no doubt this was their food-plant.

Several specimens of the handsome large skipper *Trapesites symmonius* were taken at Mallacoota in addition to three at Tostaree. Careful examination makes it almost impossible to separate these as either the typical or *soma* race. Thus it is of rather doubtful merit to regard the southern Victorian specimens, hitherto called *soma*, as a distinct race. Frequent bushes of the large coarse sword-grass *Lomandra longifolia* would suffice to support the larvae,

During early January, 1948, four specimens of a large species of *Candalides* were seen at Gipsy Point settled high on a large privet bush in flower. These had most distinct satiny-white undersurfaces and were too large to be *C. xanthospilos*, so it is most probable that they were *C. absimilis*. It is interesting to record that about sixteen specimens of this latter species were taken by V. Smith on the northern reaches of the Macallister River in Gippsland north of Heyfield. The species is very rare in Victoria and probably most specimens have been caught in Central Gippsland.

The pretty blue hairstreak *Jalmenus evagoras evagoras* Don. was found to be plentiful at Nowa Nowa, where pupae found on Silver Wattles produced small specimens with rather unusually grey undersides. Pupae from Mallacoota, where the species was not as common, however, yielded larger than normal specimens still showing rather grey undersides compared with Melbourne examples.

Specimens of the beautiful large Pierid *Dolias harpalyce* Don. were common flying round the tops of large eucalypts and settling on clumps of flowers, on those that were in bloom. This species has a slow, easy flight which is most tantalising, because it usually stays well out of reach of a net.

ACKNOWLEDGMENTS

The author wishes to thank Messrs. F. E. Wilson and J. M. Landy, of East Malvern, and V. Smith of Yallourn for notes and localities mentioned above.

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2. Crosby, D. F., "A New Geographical Race of an Australian Butterfly," *Vich. Naturalist*, March, 1951.
3. Waterhouse, G. A., *What Butterfly is That?*, 1932.

CONGRATULATIONS

Congratulations to Mr. Hugh C. E. Stewart, who has been elected as the first honorary member of the Bendigo Field Naturalists Club. This was done in appreciation of the many duties Mr. Stewart has performed for that Club, in acknowledgment of his contribution to natural history, and his interest in the Bendigo district.

Mr. Stewart will represent the Bendigo Club as well as the F.N.C.V. at the conference called to decide on an emblem for Victoria.

—L.Y.

PHOTOGRAPHIC EXHIBITION

Members are reminded of the R.A.O.U. Jubilee Photographic Exhibition on view at Kodak Galleries, Collins Street, from October 5th to 13th. This is a unique opportunity to see a fine collection of some of the work of our foremost bird photographers. Later it will be shown in Brisbane, Sydney, and probably Adelaide, Perth and Hobart.

WHAT WOOD IS THIS?

By MARGARET CHATTAWAY, Wood Structure Section

Part I

Introductory

People who handle timber regularly become able, in the course of time, to recognize various woods by their feel and look, by the way they cut, and their effect on tools, and come to know and recognize a vast range of species. But this is the result of experience and constant association with the timbers in question, and even these people are at a loss when they meet a timber they have never seen before, a piece of wood from overseas, or a new species that has only recently come on the market.

The present shortage of timber has brought many new woods on to the market, both by the utilization of a greater number of home grown species and by the import of woods hitherto little used in Australia. As more woods appear on the market, the task of memorizing them becomes more difficult, especially as some of them are not often encountered. Many people who are constantly working with woods are now asking how they can record in a handy form the main features on which recognition rests. In order to assist with the identification of some of these unfamiliar woods it is proposed to publish a series of short articles in this and later News Letters, giving the fundamental principles on which the correct identification of timbers depends, lists of the features that have proved of value in identification, and diagrams and line drawings which will explain clearly the terms in commonest use.

This need to identify something unknown and to relate it to a photograph or a published description occurs in many branches of biology, and has led to the preparation of keys which reduce this rather complicated process of identification to as mechanical an operation as possible. These mechanical keys all depend on the selection of various features from the unknown specimen, and, by choice of alternatives, they eliminate inapplicable ones and lead to a final correct determination. Experience will show that some features in a wood vary from sample to sample, and sometimes even within a single sample, while others remain relatively constant; and that some—such as colour—change with the age of the sample or with the amount of moisture it contains. Some groups of features may tend to occur together and may quickly give a pointer to the woods of a particular botanical group; others may be relatively widespread and occur commonly among woods of quite unrelated groups. Sometimes the pattern of the wood is so characteristic—as in the silky oaks and many trees of the pea family—that even if you are looking at a totally unknown wood you can say at once, "This wood belongs to the Proteaceae or the Leguminosae." Sometimes you can even say in which genus it should be placed, but more often there are several alternatives and only a careful examination of the pattern on the three different surfaces will give the correct identification. After a little practice it is easy to know which are proving to be straight forward and obvious features, and therefore the ones to be used first, and which are the ones calling for an exercise of judgment; these are the ones to leave till the end, and, with a little luck, the identification may be made without having to use them at all.

When an unknown timber has come to hand the first thing to do is to note all the things about it which can be seen with the naked eye, by feel or smell, together with such details as where it comes from, what type of country it grows in, and so on. The next thing to do is to prepare a clean cut cross surface, using a sharp knife or a razor blade. Radial (quarter

* Reprinted, with permission, from the C.S.I.R.O. Forest Products News Letter.

sawn) and tangential (back sawn) surfaces should be split and then smoothed. It is on these surfaces of the wood that the anatomical details can be seen, and it is on these anatomical features that the ultimate determination of genus and species will be made.

Physical Features

These are the things that can be seen with the naked eye or tested by the other senses, feel, smell, and even taste. While they are seldom sufficient in themselves for the identification of an unknown timber, they are useful as additional aids when the final assessment of the features is made.

A definite odour may be present as in sandalwood, cedar and rose mahogany, but it must be remembered that odour varies considerably with the age and previous history of the timber. Green timber often has a characteristic odour which disappears on drying or exposure to the air. Sometimes this odour may be recaptured by exposing a fresh surface of the timber.

Colour may vary considerably, depending on:

(a) the surface examined—the end surface may appear different in colour from the longitudinal surfaces;

(b) the moisture content of the wood—wood from freshly felled logs usually appears darker than the same wood when dry;

(c) whether it is sapwood or heartwood—in some timbers there is little difference between the colour of sapwood and heartwood, in others the difference is very marked, the sapwood being almost without colour whatever the colour of the heartwood may be. Colour decisions should always be made on heartwood, or, in the case of sapwood trees, on the colour of the mature wood;

(d) the age of the tree—timber from saplings is generally paler than timber from older trees of the same species;

(e) the age of the specimen—the surfaces of any piece of dry timber soon darken when they are exposed to the air; the true colour is revealed by making a fresh cut and exposing an underlying surface of the wood;

(f) decay and sapstain alter the colour of any timber.

Colour may range from whitish or straw-coloured to almost black. It is a useful aid to identification, as long as it is remembered that, in addition to the points mentioned above, there may be a wide range of colour within a single species. By using five main colour groups many timbers may be sorted out from one another.

1. The pale colours, white, straw-coloured, etc.
2. The browns, woods with definite brown heartwood.
3. The reds, all those timbers with a distinct reddish or pink tinge.
4. Other colours, black (e.g., ebony), purple (e.g., purple-heart), bright yellow or orange (e.g., yellow walnut); these are so distinctive that they form very useful features for identification.
5. Mottled or streaky, as in blackwood or Queensland walnut.

The Frothing Test. Shavings from certain timbers produce a soapy lather or froth when shaken up in a test-tube of water. This is a constant and reliable test, depending on the presence of saponins in the timber.

Feel. A distinct soapiness or greasiness is apparent in some woods—e.g., tallow wood or cheese-wood.

The Burning Splinter Test. Match size dry splinters of true wood are burnt. This test is of limited application, but is particularly useful when identifying the eucalypts and other pairs of timbers, e.g., turpentine and brush box, the silky oaks, rose and mira mahogany.

Weight and Hardness. Weight is based on the weight of air dried specimens at 12 per cent moisture content. Hardness is, of course, correlated with weight, but for purposes of identification it is used to indicate the difficulty encountered in cutting dry wood across the grain with a sharp knife. Hardness varies with the moisture content of the timber.

The classes used are as follows:

- Very heavy—above 62.5 lb./cu. ft. A.D.
- Moderately heavy to heavy—50-62.5 lb./cu. ft. A.D.
- Light to moderately light—30-50 lb./cu. ft. A.D.
- Very light—less than 30 lb./cu. ft. A.D.
- Very hard and horny to cut—as ironbark.
- Hard to cut—as satinay or blackbutt.
- Intermediate to cut—as silky oak.
- Soft to cut—as kurrajong.

There are other general features, such as habitat, strength, uses, etc., that can be added to this list, but however many are added they seldom serve for a complete and certain identification of an unknown or unfamiliar timber. For such woods recourse must be made to features which are less easily visible, or even not visible at all, to the naked eye, but which can be seen readily with the help of a hand lens giving a $\times 10$ magnification. With this aid the pattern of the wood can be seen; this is formed by the different arrangements of the various types of cell of which the timber is composed. There are not many of these different cells, but they can be arranged in a great variety of ways, and after a short study of them it is often possible to place a timber quickly and accurately among a group of closely related woods. Just as criminologists have found that the whorls of the human thumb or finger can give an infinite variety of "prints", so the wood anatomist comes to find a great variety of patterns appearing on the surface of the wood, and giving to each timber a characteristic "finger print" by which it can be recognized. The anatomical features that can be seen with a hand lens will be listed and explained in later articles of this series.

ERRATUM

In "A New Species of Victorian Moss" (*Vict. Nat.*, Sept. 1951, p. 83), first line of Latin diagnosis, read: "*solo humido ripis*," instead of "...
humidi ripis." These mistakes in spelling are regrettable and the author accepts full responsibility.

—J.H.W.

GIFT FROM THE ESTATE OF THE LATE DR. SUTTON

We have received through Mr. Don Greenwood, on behalf of Mrs. Sutton, a valuable and extensive collection of 343 different species of eucalypt seed cases. There are also a few specimens of native timbers.

Anyone with any knowledge of this difficult genus will understand the work entailed in collecting this quantity of material.

The Librarian also gratefully acknowledges a number of books dealing with New Zealand flora.

—A. A. BURKE

THE EUCALYPTS, MOTHER OF AUSTRALIA'S RIVERS

By A. O. BARRETT

(Resumé of a Broadcast Address, by permission A.B.C.)

My first observations on eucalypts were made in 1880 at the Melbourne Church of England Grammar School during a heavy shower of rain. I had just come from the fields and lanes around the ancient town of Banbury, in England; and being an English boy, I ran to a large eucalypt tree for shelter. I found there was no shelter except on the lee side of its trunk.

I was astonished, on gazing up through the canopy of the eucalypt, to see rain drops hurthing down to the ground intact. Others splashed into spray, hitting young leaves, but no drops remained on them, because the leaves were covered with a kind of plum bloom, and hung downwards. No water could therefore adhere to them. As for the old leaves, only a skeletal framework of water remained on them.

Then I noticed another extraordinary effect. When the rain drops hit the smooth white bark of the branches, some remained and ran to the underside, where it joined up with a rummel of water that coursed down the main trunk, down which streams of water were flooding to the ground.

Now all this I thought was magic; so different and opposite to what happens in England, where the deciduous trees in leaf, and a certain pine tree in winter, give ample shelter from rain.

Just then the school bell pealed out its summons to the classroom, so I had to walk out of the world of wonderment, and store its dreams away in the world of memory. But I had found out what goes on with a eucalypt in rain.

A year afterwards, my brothers and I went to the foot of the Dandenongs, and camped by the side of a pool of water, in the forests there. During the night a fog enveloped us, and all through the dark hours great drops of water condensed on the leaves of the trees, and fell continuously on the tent. Spray even came through. About dawn, I got up and made up the fire, and went to fill the billy for tea. I found all around was drenching wet, just as if we had had a storm.

Since then, I have seen this in many eucalypt forests, and on roadsides as well. An enormous amount of water that feeds the springs comes from this source. But if one examines the effect of fog on the conifers one discovers that it condenses among their needles as water. There it stops and little falls to the ground.

Many people in Victoria may remember, years ago, when the Prince of Wales visited Melbourne, that we had dense fogs at night. One night I went out with my lantern to see what was going on, and found all the Australian trees in my seven-acre garden were so dripping with water that on the boundary fence it had overflowed over the footpath into the gutter, and ran in a stream right to the main road, two hundred yards away.

At the same time, little water was falling from the conifers, of which there were many, although if one shook any of their branches a drenching resulted. When the sun rose and heated this imprisoned water, and so reduced its viscosity, some did fall, but the great mass of it on the needles evaporated, and was lost to Australia.

Shortly after this, some genius proposed that half a million acres of the River Murray watershed should be planted with conifers to provide us with softwood timber, and that the eucalypts should be removed.

So, knowing what I thought I knew, I determined to measure the water that got to the ground from conifers and from eucalypts and compare it with a standard rain gauge, just to find out the truth of my theories.[†]

[†] For full details and photos, see *Australia's Entail*, by A. O. Barrett, published 1932 (Robertson & Mullins ed.).

The only way I could think of to do this was to build a series of huge rain gauges under selected trees, and compare the water collected from them with the water collected by the standard rain gauge. The Director of the Weather Bureau in Melbourne very kindly lent me a rain gauge.

Of the eucalypts, I chose the *Eucalyptus botryoides* and the *Eucalyptus saligna*. The pines I selected were the Queensland Kauri (*Agathis robusta*), the *Pinus insignis*, the *Cedrus deodara* and the *Cedrus atlantica*.

The reason I chose the Kauri pine was because I had noticed that it precipitated more water from fog per square foot of ground area around it than any other tree in my garden. This was due, no doubt, to the fact that its densely leaved branches do not extend more than about 8 feet from its trunk. As it happened, however, no fog came to give point to this part of the experiment, I had therefore to rely on rainfall.

It was necessary to build the catchments under the trees of timber, floor them with wood, and cover this with flat galvanized iron of 18 gauge. The water had to be made to run down a 6-inch pipe into the calibrated rain tanks below. These tanks were 2 feet square, and contained a flat length of iron fastened to the side and painted with aluminium paint, on which the points of rain collected could be seen at a glance, when the lid was removed. Many of these catchments were 24 feet square, and were built so as to prevent any rain getting on to them unless it fell from the canopy of the tree.

The catchments were not easy to make, but they were passed as correct as was humanly possible by all the botanical and weather experts who were called in to examine them.

I also built a smaller edition of them in the open to find out how many points of rain were required to cause the water to run off those beneath the trees. It was obvious that it was necessary to wet the surfaces, before any would run off. I found it took 1.5 points of rain to do it, but I could not use this information, because although all the surface of the catchments under the Australian trees were wet after the rain, sometimes they were not wet under the conifers; so little got through.

All the catchments were fastened to the trunks of the trees, and grouted in or sealed with bitumen, so as to retain and measure the water that ran down their trunks.

Each rain tank was fitted with a 2-inch drain cock and as soon as the volume of water collected from one rainfall was noted, the tank was emptied ready for the next. This was done at nine o'clock in the morning for fifty rainfalls, and compared with the water collected by the rain gauge.

Each catchment had a ladder attached to it so that it could be cleaned of debris, and each rain tank also, if required.

This experiment began on July 17, 1934, and ended on the following December 10, after fifty measured rainfalls.

And these were the results. The rain gauge showed 1404.0 points of rain. The *Eucalyptus botryoides* showed 1006.25 points and the *Eucalyptus saligna* 1140.3 points. The Queensland Kauri catchment registered 1203.3 points. The three conifers showed 371.5, 419.5 and 545.5 points. The lowest of them was the *Cedrus atlantica*.

It was clear therefore that, taking the rain gauge as having made 100 per cent gain of water, the conifers caused a 68.1 per cent loss of water to the earth, while the loss from the Australian trees was only 20.6 per cent.

I therefore deduce that, if the conifers had grown on our watersheds after the last Ice Age as they have done in Europe, our rivers would only be one-third of their present volume, and if eucalypts had grown on their watersheds instead of conifers, their countries would be drowned in swamps, lakes and huge rivers. Yet no one here puts up a monument to glorify the trees, that alone allow us to live here.

I read, years ago, a book by Stuart Chase of U.S.A. called *Rich Land, Poor Land*, in which he dealt with water that got into American rivers from the primeval forests of conifers. It had been found, he said, that in dry years some 13% of the rainfall reached the rivers, and in wet years about 23%. In Victoria, I am informed, 31% flowed off our watersheds in dry years, and up to 55% in wet years.

This corresponds singularly to the measurements in my experiments, and explains the puzzles of water conservation engineers outside Australia, who do not comprehend the flow we get from our watersheds.

All this presupposes the realization by most people that unless watersheds are clothed with trees, herbage, grasses and so on, heavy rainfalls will smash soil down the mountains, and ruin rivers, creeks, lakes and reservoirs with silt.

Therefore, as we must have forests on watersheds, we may as well leave our inestimable flora on ours, and glorify Australia's salvation—the eucalypts.

"THE NATURALIST IN THE FIELD TODAY"

(By Dr. A. E. R. Ennion)

At the meeting of the British Association for the Advancement of Science which was held last year in Birmingham, Dr. Ennion addressed the Conference of Delegates of Corresponding Societies, and took as his theme the work that is being done by field naturalists in Great Britain today. While much of his discourse refers particularly to the study and preservation of the remnants of the natural flora and fauna of Great Britain, there are parts of it which can be applied with equal fitness to Australia.

Dr. Ennion, Warden of the Field Study Centre at Platford Mill, Essex, stresses the importance of working in the field and indulging in serious study, which will not merely be a pleasant hobby for the individual, but will also advance knowledge.

Recently the F.N.C.V. was invited to take part in an oecological survey of plants in Victoria. The importance of such a work does not need stressing, but it will take time, and call for individual training on the part of those helping. How Great Britain has approached the problem of further training for the amateur makes interesting reading.

Members of the F.N.C.V. can read this address for themselves in *The Advancement of Science*, Vol. VII, 27, Dec 1950, pp 285-292. A copy is available in the F.N.C.V. library.

—M.M.C.

ABOUT A SPOTTED PARDALOTE

On a recent excursion to Hurstbridge led by Mr. W. Haase, a call was made on Mr. Wilson of Flat Rock Road, who provided the party with hot water for lunch and showed us the native plants in his garden.

A Spotted Pardalote (*Pardalotus punctatus*) which pursued his vigorous search for insects at our very feet was first favourite among the visitors to that garden. His nesting tunnel was in the face of a hole from which stone was being quarried for use in the foundations of a new home, and at a depth of about eighteen inches below the surface. The quarry hole, some twelve feet across and ten feet deep, will eventually be used as an underground water storage.

Quarrying operations are carried out in such a manner that the pardalote is disturbed as little as possible and, up to date, he has not found it necessary to seek a new nesting site.

—A.E.B.

WHAT, WHERE AND WHEN

General Excursions:

- Sunday, October 14—Kalamia, Mt. Evelyn. Subject: Botany. Leader: Mr. B. Jennison. Train: 9.15 a.m. Croydon, then bus to Kalamia. Bring two meals.
- Sunday, October 21—Mystery Excursion. Leader: Mr. A. E. Brooks. Train: 1.30 p.m. Cheltenham. Book 2nd return.

Preliminary Notices:

- Thursday and Friday, November 1 and 2—Junior Field Naturalists Club Exhibition, Hawthorn Town Hall. 10.30 a.m. to 9.30 p.m.
- Tuesday, November 6—Club Annual Picnic. Brien's coach leaves Batman Avenue 8.30 a.m. Itinerary: Ferntree Gully, lunch at Emerald Park, then Gembrook and Pakenham, home along Prince's Highway. Reserved seat bookings, 15/-, with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E. 1, Melbourne.

Group Fixtures:

- Tuesday, October 14—Native Plants Preservation Group. At home of Miss W. Waddell, 34 Chesham Place, Toorak, at 8 p.m.
- Monday, October 22—Botany Discussion Group. Royal Society's Hall, 8 p.m.
- Thursday, November 1—Wildflower Garden Group. Royal Society's Hall, 8 p.m.
- Friday, November 2—Marine Biology Group. Royal Society's Hall, 8 p.m.

—K. Atkins,

Excursions Secretary.

EXCURSION TO BORONIA FARM

Once again, through the courtesy of Mr. A. C. Chandler, about eighty members and friends (including some Hawthorn junior members) visited his property at Boronia on September 1, where they saw the growing, on a large commercial scale, of the fragrant *Boronia megastigma*. The lovely "red" boronia was much admired. Mr. Chandler has received an award from the Horticultural Society for his work in propagating this strain.

The many questions of interested members were patiently answered and at the end of the visit members were allowed to pick daffodils to accompany the generous bunches of boronia, the perfume of which over the next week would revive happy memories of what is always a most popular excursion.

—I.M.W.

OLD COPIES OF "NATURALIST" NEEDED

The Director, Botanic Gardens, South Yarra, S.E.1, is anxious to obtain a set (or any particular volumes, *except* Nos. 52-56 inclusive) of the *Victorian Naturalist* from Vol. 1 to 64. Any member having such "spares" which are no longer needed for reference, is asked to contact the Director and state the value that he places upon them.

The Victorian Naturalist

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NOVEMBER 9, 1951

No. 815

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, October 8, 1951. The President, Mr. E. E. Lord, was in the chair and about 300 members and visitors attended.

The President gave a cordial welcome to members and their friends, and to the visiting delegates and members of the Royal Australasian Ornithologists Union, who were holding their Jubilee Annual Congress in Melbourne.

Mr. and Mrs. Edward Bourke were elected and welcomed as Joint Ordinary Members, and nominations were received on behalf of the following: As Ordinary Members, Mrs. Opal Glenie, 12 Crimea Street, St. Kilda (Miss Waddell/K. Thomas), and Mr. Perrin, 54 May Road, Preston (E. E. Lord/Miss Morton).

The Secretary reminded Club members of the Annual Picnic to be held on Cup Day, and announced that a Natural History Night will be held at the Herbarium on November 23, 1951 to raise funds for the purchase of a screen. Members are requested to be present, accompanied by their friends.

Mr. Swaby announced that 25 acres of Cheltenham Park had been set aside as an Australian National Garden and expressed gratification at this supplement to Maranoa Gardens.

The meeting was then placed in the hands of members of the Royal Australasian Ornithologists Union. Dr. R. Falla (President) gave an introductory talk, followed by films of the rare Notornis, a bird thought to be extinct, but recently re-discovered in the South Island of New Zealand. The microphone was then handed to Mr. Norman Chaffer, of Sydney, who gave a commentary on his fine colour films of birds, and of marine life on the Barrier Reef.

Mr. Lord expressed the appreciation of the Field Naturalists Club of Victoria for the memorable evening given them by the Royal Australasian Ornithologists Union.

EXHIBITS

PAINTINGS: Group of native flower paintings—Mr. H. P. Dickins; series of paintings and drawings of native flora—Mr. Haas.

FLOWERS: South African Chincherinchee (*Ornithogalum lacteum*), grown as a pot plant at Hawthorn East—Miss E. Raff; collections of native plants, garden grown—J. S. Seaton, E. J. Carberry.

ORCHID. Red-beak Orchid (*Lyperanthus nigricans*)—A. E. Brooks.

PHOTOS.: Cut-leaf Phebalium (*Phebalium abenardatum*), showing the flowers and the markings on the back of the petals enlarged many times—R. D. Lee.

FISH: Mal-formed Brown Trout fry; "Siamese twins" and two-headed eggs from Tasmania, hatched at Wartook—R. B. Jennison.

SHELLS: Marine shells from various localities—*Spondylus tenellus* Reeve, Victoria; *S. imperialis* Chem., Western Australia; *S. nicobaricus* Chem., Barrier Reef, Queensland; *S. gerderepus* Linn., Mediterranean. "Thorny Oyster," sometimes called Spiny Oyster. Not an oyster, but an affinity of the scallop. Victoria is represented by one species only. Specimen displayed was dredged from Bass Strait—J. Gabriel.

"MEMOIR ON FOSSILS OF THE LATE PRE-CAMBRIAN (NEWER PROTEROZOIC)"

(By Sir T. W. Edgeworth David and R. J. Tillyard.)

This book, a recent gift to the library of the F.N.C.V., has been, and indeed still is, the subject of much controversy in geological circles.

It describes in detail what Sir Edgeworth David and Dr. Tillyard believed to be—after much work and study—the fossil remains of Arthropoda, resembling in a very generalized way Arachnids and Crustacea, but coming from a series of rocks very much older than any from which fossil of this type were known previously. Many perhaps most, geologists are sceptical regarding the organic origin of these "fossils", and consider them to be of mineral origin, or prefer to be non-committal. The whole question needs very careful restudy, both on the original material which is available in the Geological Museum of the University of Sydney and any new material which may become available.

It should always be remembered that Sir Edgeworth David and Dr. Tillyard were eminent practical scientists in their own fields, and that the "daring" conclusions of pioneers, rejected at first, have often been proved correct by later and more extensive knowledge.

—T.C.B.

THE PRICE OF TEA

When Mr. G. N. Hyam conducted an excursion in the Botanical Gardens earlier this year, he took "Economic Plants" as his subject. Among much interesting information, he told us that in countries where tea is grown it takes a picker one whole day of unspecified length to gather enough young shoots to produce one pound of tea. He explained that the reason why tea has not been grown in Australia is not through unsuitability of climate, but because of the high cost of harvesting.

My own estimate is that if tea were grown in Australia and gathered by local manual labour, the cost of tea to the consumer would be about five Australian pounds for one pound of tea!

—A.E.B.

NEW BEES AND WASPS — PART XVI (Contd.)

Primitive Wasps

(With Description of a New Species and a Subspecies)

By TARLTON RAYMENT, F.R.Z.S.

Guiglia queenslandensis coronatus, subsp. nov.

(Proc. Linn. Soc. N.S.W., Vol. xxv. p. 514, 1900.)

TYPE. Female.—Length, 12 mm. approx. Black, red legs.

Head small, circular from the front, deeply pitted, numerous short silvery hairs; face elevated, the margins developed to high fine carinae, so that the frons appears to occupy the whole of the front of the head; clypeus excessively small, with a median node; supraclypeal area indistinguishable, unless the whole area of the "face" be so regarded; the vertex depressed, forming a basin surrounded by a coronet of nodes, with the median ocellus in the centre; compound eyes diverging widely below; the coronet has forced the lateral ocelli on to the orbital margin; genae rugose, with short silvery hair, a sharp carina parallel with the orbital margin; labrum not visible on the type; mandibulae spherical; antennae with the short stout scapes inserted under the anterior margin of the frontal area, and so low down that they appear to be above the labrum.

Prothorax from above extending laterally as two large sub-circular plates covered with straw-coloured hair; tubercles masked by the large lateral plates of the prothorax; mesothorax rugose, a dusting of fine silvery hair; the scutal and parapsidal carinae exceedingly developed; scutellum coarsely punctured, with similar hair; postscutellum more rugose; metathorax very large, coarsely punctured and, of course, not at all constricted to a waist as in *SPHEGMÆ*; abdominal dorsal segments deeply and closely punctured, shining, and each with a lateral patch of iridescent golden hair; ventral segments black, and small, sternite 2 with small lateral nodes.

Legs red, comparatively small, femora strongest, the median and hind tibiae with about twelve black spiculi; the anterior tibiae with a remarkable development as though it were dividing into an apical segment; anterior tarsi with only three recognizable segments; claws red, simple; hind calcar short and stout; tegulae black, and not prominent; wings with two transverse areas strongly infuscated; the hairs on the dark areas are much stronger and blacker; those on the clear areas are smaller and paler; nervures blackish-brown in the infuscated areas, but pale-amber on other areas; cells approaching the form of the *TRIGONALIDÆ*, rather than that of the *Saw-flies*; pterostigma large, hyaline, suffused basally with reddish-amber; hamuli four or so of primitive structure.

Locality: Fraser Park, New South Wales, 29th December, 1947, Norman W. Rodd.

ALLOTYPE. Male—Length, 8 mm. approx. Black, legs red.

Head rugose, deeply sculptured like that of the female, especially on the vertex, where the nodules are very prominent, forming a similar coronet; frons as in the female, but the rugose sculpturing is coarser; the whole of the integument in both sexes is "dusted" with shining fine short white hair; compound eyes approach the holoptic condition of *Meliribus* and *Apis*; there does not appear to be any dimorphism or specific characters in the mouth-parts of the sexes; antennae with 11 segments, the apical one being acute. There is little, if any, difference in the antennae of the two new species.

Prothorax very strongly developed; tubercles not conspicuous; mesonotum excavated, and much rougher in sculpture; scutellum, postscutellum and metathorax strongly rugose; coarsely punctured, with silvery hair; abdominal dorsal segments coarsely and irregularly punctate, with a minute pygidial plate; ventral segments simple.

Legs with five tarsal segments on all; a conspicuous patch of silver hair on hind coxae; tarsi with the fourth segment smallest on both sexes; all the tibiae and tarsi are slender; tegulae with amber patches; wings infuscated on certain defined areas only; nervures are slightly better developed on the male, but no intercubitus nervures are present; no defined cubital cells; pterostigma conspicuous; hamuli four.

Locality: Fraser Park, New South Wales, 29th December, 1947, Norman W. Rodd.

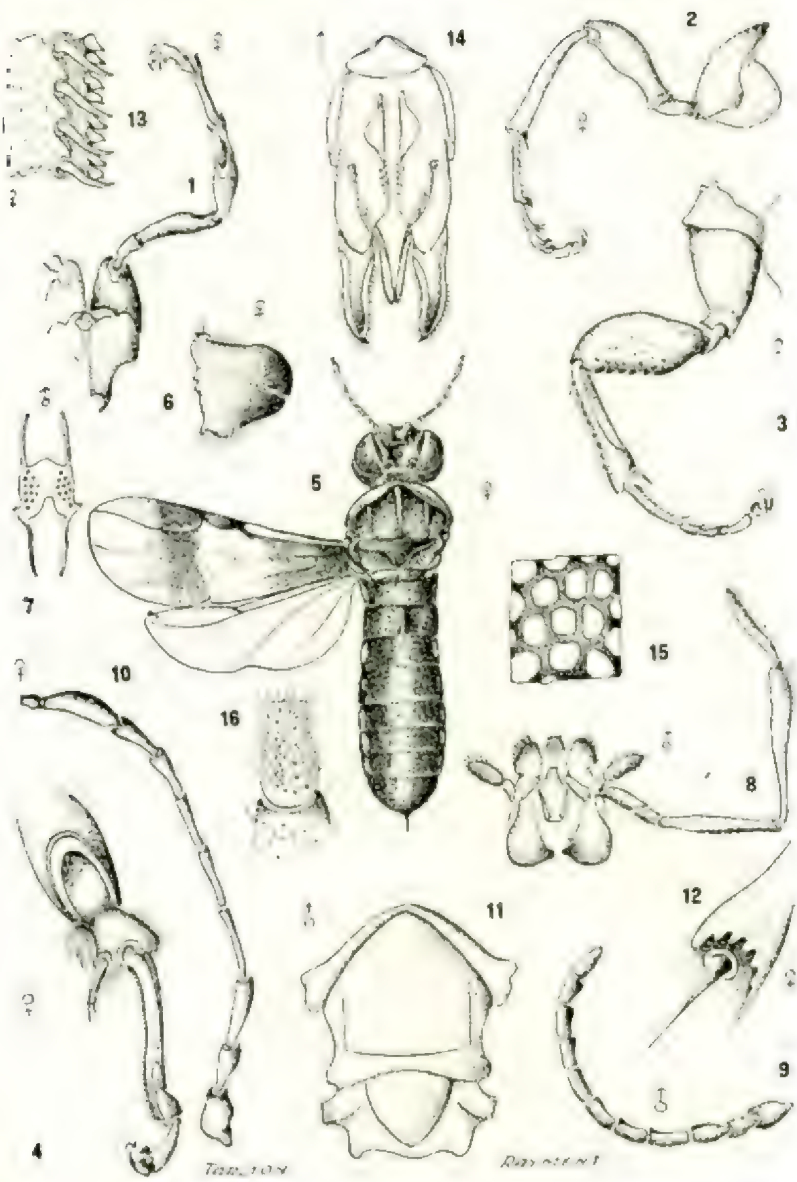
Type and Allotype in the collection of the author.

Allies: Not very close to *O. normani*, sp. nov., which has much rougher tegument. *O. normani* may easily be separated from *G. queenslandensis* (Turn.) by its smaller size; the absence of the coronet on the vertex; the large deeply-pitted sculpture of the mesonotum and total absence of the three prominent carinae, the

KEY TO ILLUSTRATION

1. Anterior leg of the female wasp, *Orussobius normani*, sp. nov.
2. Median leg.
3. Posterior leg, showing the stout coxae and the spicula.
4. Enlarged view of the remarkable anterior tibia and tarsi.
5. Dorsal view of female *G. queenslandensis coronatus*, legs not shown.
6. The short spoonlike mandible of the female.
7. Hypopharynx of male *O. normani*.
8. Mouth-parts showing the short stout stipes, galea, labial and maxillary palpi of male.
9. Antenna of male.
10. Antenna of the female *O. normani*.
11. Prothorax, mesothorax and scutellum of male *G. queenslandensis coronatus*—out of proportion; being pressed flat.
12. Enlarged view of a tibial spicula.
13. Enlarged view of margin of the anterior basitarsus of female.
14. Genitalia of male *O. normani*.
15. The coarse punctures produce a rugose effect on the tegument.
16. Apical segment of the female antenna is alike in both species.

PLATE IV



absence of the lateral carinae on the apical ventral segment of the abdomen which lacks the golden hair-patches of *G. queenslandensis*. Turner stressed the presence of two smooth maculae laterally on the plate beyond the metathorax, and the Fraser Park specimens have such maculae, although they are more correctly described as microscopically granular.

G. sordidus Mocs., with male 8 mm. and female 6-11 mm. is larger than *O. normani*, which lacks the ten tubercles disposed in two orderly rows on the frontal carina. The reddish legs are coloured like those of *O. normani*.

Orussobatus normani, sp. nov.

TYPE. Female—Length, 7 mm. approx. Black, legs red.

Head with deeply-pitted sculpture; face entirely lacking the lateral longitudinal carinae of *G. queenslandensis*; frons excessively long; clypeus excessively short; supraclypeal area large, owing to its fusion with the frons; vertex without the coronet of *queenslandensis*; compound eyes converging above; genae prominent; labrum not visible in type; mandibulae short and spoonlike; antennae with a minute apical segment, and a more or less ovoid scape; there are no specific characters in the flagellum.

Prothorax deeply pitted, and well developed; tubercles inconspicuous; mesothorax rugose, and lacking the scutal and parapsidal carinae of *queenslandensis*, but there is a slight median depression posteriorly; scutellum, postscutellum and metathorax all rugose from the deep pitting; the whole insect is more rugose than *queenslandensis*; abdominal dorsal segments coarsely punctured, but all lack the lateral patches of golden hair; apical ventral segment without the lateral carinae of *queenslandensis*.

Legs dark-red, the anterior tibiae marked, as in *queenslandensis*, with a circumferential suture, anterior tarsi with only three segments; claws simple; hind calcar red, finely serrated; tegulae blackish, but inconspicuous, wings with the infuscation of *queenslandensis* reversed, and not so prominent; nervures dilute sepia; cells not well defined, except the small discoides and the radial, pterostigma large and well developed; hamuli four.

Locality: Lane Cove, Sydney, New South Wales.

ALLOTYPE. Male—Length, 5 mm. approx. Black, red legs.

Head transverse, coarsely rugose, face without any hair; frons excavated, with the median sculpture very rugged, but without the lateral carinae of *queenslandensis*; clypeus exceedingly small; supraclypeal area and frons appears to form a large single area; vertex with the lateral ocelli close to the orbital margin, and from the top the rugae go down the front in transverse waves; compound eyes converging above; genae with excessively deep pitting, and numerous fine white hairs; labrum rugose, small; mandibulae spoonlike; antennae as in *queenslandensis*.

Prothorax prominent, coarsely rugose, with fine white hairs; tubercles inconspicuous; *pleura* coarsely rugose, with fine white hair; *mesothorax* with the excessively coarse rugosity tending to run in concentric rows; fine parapsidal sutures; *scutellum* with a fine low carina and coarse pitting; *postscutellum* coarsely rugose; *metathorax* with a low median longitudinal line, rugae tending to become longitudinal; abdominal dorsal segments with large close circular punctures on the basal third, but the apical two-thirds are longitudinally rugose, the hind margin with a fine golden line; ventral segments with considerable fine short silvery hair; a minute pygidial plate.

Legs with *coxae*, *trochanters* and basal half of *femora* black, other parts dark-red; hind *femora* almost ovoid; *tarsi* dark-red, with fine white hair; *claws* dark-red; hind *tibiae* and *femora* with a number of black spiculae; both hind *calcariae* amber, finely serrated; *tegulae* finely punctured; wings slightly infuscated, the posterior with a large anal lobe; *nervures* dark-brown, and better defined than in *queenlandensis*; the radial cell well defined, and so is the rectangular discoidal; *pterostigma* blackish-brown all over; *hamuli* three in a group, with two primitive ones very distant.

Locality: Lane Cove, Sydney, New South Wales, 4th October, 1947, Norman W. Rodd.

Type and Allotype in the collection of the author.

Allies. Approaches *G. queenlandensis* Turn. and *G. sericatus* Mocs., although not very closely, but is very near *O. minutus* Hens., which is smaller.

The species is dedicated to the collector.

A HYPERPARASITE

A critical examination of the ventral surface and legs of the large females of *G. queenlandensis coronatus* revealed twenty or so tiny mites, of a golden-amber colour: clustered about the *coxae*. These acarine mites are rather elongate, with a more or less dark spherical structure anteriorly on the head, and which is quite unlike any acarid mite found on the many bees studied by the author. The genus of the mites has not yet been determined.

On bees the mites usually congregate in a depression on the basal segment of the abdomen, and that place is probably the most inaccessible to the leg-brushes and the claws of the hosts.

Since the Orussids have no such basin, and are capable of only very restricted lateral and still less downward movement, the coxal sutures probably afford the safest shelter.

GROSS MORPHOLOGY

The general aspect of the long, parallel-sided body is due to the utter absence of any constricted segments to form a waist, so that the insects are capable of only slight vertical movement.

From the front, the small head is almost circular, with little development of the vertex, although the genae are rather prominent; the frons is huge, and occupies the largest part of the head; the margin is marked by conspicuous carinae, so that a paracocular area (Michener) is sharply defined in *G. queenslandensis*.

Michener, 1944, suggests:

If frontal sutures exist at all in the HYMENOPTERA, which seems doubtful since they are clearly evident in none of the CHALASTOGASTRA which I have examined, they have fused to a point far below the anterior ocellus . . . and are represented below by the subantennal sutures. Thus the frons would be separated by the formation of a parietal bridge into two parts, a small one around the anterior ocellus, and a larger one or antefrons (Crampton 1921 A) above the clypeus.

The condition postulated by Michener appears to be present in *G. queenslandensis*, although I have no specimens for dissection which would enable me to put the point beyond dispute.

The clypeus is excessively small, the globose scapes being inserted just above the mandibles, which are small, subtriangular and spoonlike; the antennae long and slender, with 10 segments in the female, and 11 in the male, the apical segment of the female being very small, and highly specialized; the apical segment of the male flagellum is acute, a condition seen in the American genus of bees, *Hoplitis*; the ocelli are widely spaced, the lateral ones being contiguous to the small compound eyes; adjacent to the posterior orbital margin is a deep groove, the homologue of a structure present in many bees, especially *Megachile*; the labrum is small and inconspicuous.

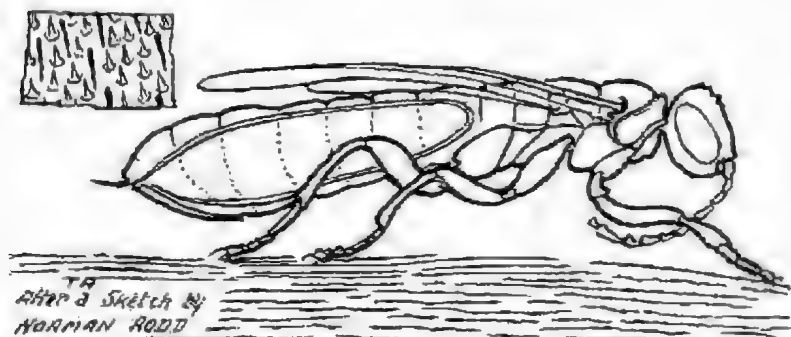
The longitudinal lateral carinae of the frons appear to be homologous with the prominent processes on the remarkable bee *Sphaerhyllacus procurtus* Raym. 1939. There are five segments in the maxillary palpus, but in the female it would appear that the very short basal one is marked by a diagonal suture, and that only four segments are present, but in the female it is more clearly defined as two distinct segments. The labial palpus has three segments, the apical one being the largest. The glossa is excessively short, with a primitive arrangement of setae; the stipes are almost oval, and the galea short, broad, and heavily fringed with setae.

The thorax is excessively developed, owing to the absence of constricted segments: the pronotum is conspicuous dorsally, but laterally the angles are represented by large flat plates; the mesonotum is small, but the parapsidal and median mesoscutal lines in *G. queenslandensis* are developed into broad strong carinae; the scutella are well defined, and the metathorax is large, and the plate posteriorly of the metathorax is large and strong, with a median carina, but not divided.

The abdomen is parallel-sided, the terga often depressed along the hind margins, and frequently ornamented laterally with patches of iridescent simple hair; the sterna are small, but the apical

segment is long, sometimes with carinae and a suture adapted for the extrusion of an excessively long ovipositor, with a slender terebra, as in CYNIPODEA.

This remarkable organ is coiled longitudinally and medianly within the abdomen, just under the interior of the abdominal plates as in the gall-wasps.



Graphic section of a female wasp to show the position of the ovipositor when coiled inside the abdomen. Inset: At the base of the anterior wing, in all the species, there is a microscopic area covered densely with long and short peg-hairs.

From a sketch by Norman W. Rodd.

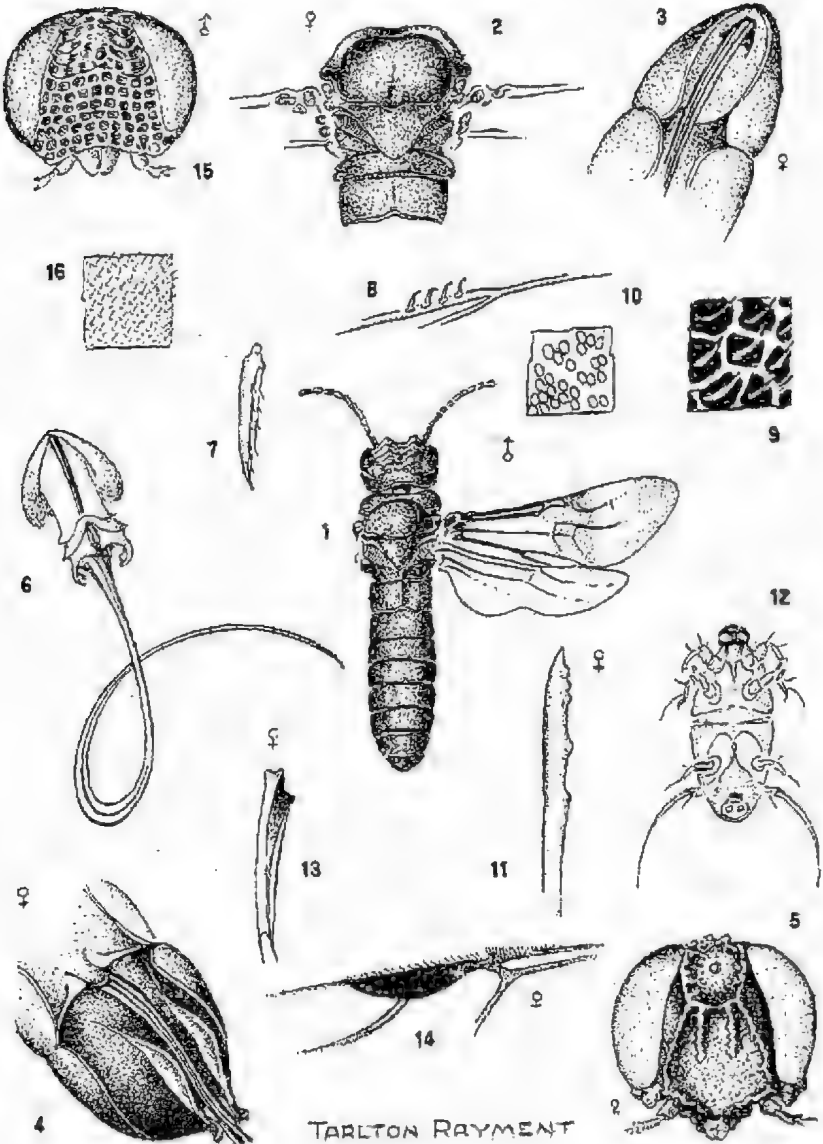
The legs are small, but the coxae of the anterior and hind legs are large, the latter markedly so; the median coxae are poorly developed; trochanters very small and simple; femora strong, but especially the hind pair; the median and hind femora and tibiae bear a number of spicules, but the anterior tibia of the female is most remarkable, for it appears to be partially divided, and but for the strigilis at the apical end it might be mistaken for the basal segment of the tarsi. In the mounted preparations the apical portion has actually become detached as though at a suture.

The median and hind tarsi have five slender segments, but the anterior tarsi of the female have only three segments, as Lefroy (1923) observed; the basitarsus is developed apically beyond the small second segment. The calcaria are short, and finely serrated; the tarsal claws small and simple. The male has five segments in all tarsi.

The strigilis has a strong, bowed malus, but only a narrow line of hyaline velum; the opposing "comb" is the merest development of the margin of the closely-spined basitarsi—the most primitive condition yet observed by the author.

The regulæ are poorly developed, although the sclerites of the axillæ are large and strong; the four hamuli are hardly to be termed hooklets, being little more than small bent pegs.

PLATE V



The wings are small in comparison with the bulk of the body, the anterior one being blotched; only on such infuscated areas are the nervures strongly defined, but on the whole the neuration is less defined than in the saw-flies. The chief features are the large radial cell, the absence of defined cubital cells, the branched brachius nerve, the well developed pterostigma, and there is a large anal lobe on the posterior wing.

The males are very much smaller, but there is a conspicuous variation in the size of individuals in both sexes; the head-capsule shows the same large frontal area, the anterior margin of which forces the lateral ocelli against the orbital margin, and the converging of the compound eyes at the vertex suggests the origin of the holoptic eyes of *Meloboris* and the drone of the hive-bee.

The antennae differ from those of the female, the apical segment being acute; in the female it is very different, being small, and unique in structure. The collector thought that the specialization might be selective in detecting the presence of the host. In *Orussus*, sensu stricto, the subapical segment is truncated.

The anterior legs lack the extraordinary suture of the female; and the apical segment of the gaster is, of course, simple, being without the median groove and the lateral carinae, but apart from these differences the males have a somewhat similar facies to that of the female. There are five segments in all the tarsi, and there is a small hyaline empodium in both sexes, and the claws are simple.

Schwarz (1948) considered that the number of hamuli is more closely correlated to the body weight of the insect than with the wing length, and did not agree with the author that the number of hamuli is an infallible guide to the air-range of the bee.

KEY TO ILLUSTRATION

1. Dorsal view of male wasp, *Orussobatus normani*, sp. nov.
2. Dorsal view of thoracic segments of female; note the absence of strong parapsidal carinae.
3. Oblique ventral view of apical segment of the female.
4. Oblique ventral view of apical segments of the female *G. queenslandensis coronatus*.
5. Front view of the head-capsule of female.
6. Apical segments of female *O. normani* Raynt., showing the excessively long ovipositor, and two valvulae.
7. The hind calcar is short, with few serrations.
8. The four hamuli of the posterior wing are very primitive.
9. Each deep pit of *G. queenslandensis coronatus* has an appressed straw-coloured hair.
10. The Acarine mites appear to be heavily infested internally with some spore-like organism.
11. The "barbs" on the tip of the ovipositor are very primitive in form.
12. Ventral view of the Acarid mite found on *G. queenslandensis coronatus*.
13. Strigilis of the anterior leg of the female; note the undeveloped velum.
14. The pterostigma of the posterior wings.
15. The rugose sculpture of the front of the head-capsule of male *O. normani*.
16. The fine hairs of the blotched areas are stronger than those on the hyaline portions.

(All the diagrams were drawn with the aid of a camera lucida, and allowances must be made for the distortion brought about by pressure of the cover-glass.)

In his splendid monumental work on the stingless bees, Schwarz measured the wings of a large number of individuals in *Melipona* and *Trigona*, and found that bees measuring from 6 mm. to 11.50 mm. in length possessed from 9 to 13 hamuli on the posterior wing.

The author based his statement on measurements of and experiment with bees in many Families. In the case of the Orussid wasps, large heavy females measuring 12 mm. in length have only four primitive hamuli, whereas very much smaller and lighter Halictine bees have seven well-developed hamuli. Orussid wasps have no need for a wide air-range, since a sufficient number of hosts may be present in one log. Wilson described his species as "crawling" on the trunk of a wattle tree.

The wasp's limitations are indicated by the experience of Gilbert Turner, who took the type *G. queenslandensis* easily with his fingers on a "gum tree" post, and a second on a fallen log.

FIELD NOTES.

The following observations were supplied by the collector, Norman W. Rodd, whose keen interest has added much to our knowledge of the Hymenoptera.

On the 4th October, 1947, I was collecting at Fraser Park, between Newcastle and Sydney, on the coast of New South Wales, and found a fallen tree, *Angophora limicolata*, spanning a small creek within half a mile of the surf beach. After a close search, I observed two female wasps, one of which was ovipositing in the hard dry wood of a branch.

Despite a thorough search of other fallen *Angophora* trunks in the locality, I was not able to discover any more of the wasps, although the logs were heavily infested with beetle larvae. Unfortunately, an accident prevented me rearing the larvae to maturity. Later, between the 21st and the 29th December, of the same year, I took six females and five males from the log.

At Narooma, on the South Coast, on the 24th December, 1946, I collected a solitary male of the larger species, but eighteen days earlier I had taken another male of this species at Lane Cove, near Sydney.

These wasps proved to be the larger *G. queenslandensis coronatus*, and the most southerly record in the literature was Dorrigo, so the Fraser Park, Sydney, and Narooma specimens push the habitat still farther south. The most southerly record is, of course, Upwey, in Victoria, where *O. wilsoni* was taken. The smaller new species was taken at Lane Cove, which is close to Sydney, and the collector sends the following note:

The new wasps were taken from the trunk and branches of living wattle trees, *Acacia longifolia*, which are numerous in the "bush" about here. The females were again observed ovipositing in a branch of the wattle. The bark was immediately stripped off, and numbers of Buprestid beetle-larvae were present in the tunnels beneath. Since I did not succeed in rearing any of the parasitized larvae, I am unable to state definitely which Buprestid is the host.

It is probable that intensive searching would prove these wasps to have a wider distribution, and are somewhat less rare than has hitherto been recorded. There is a very considerable variation in the size of these

wasps, especially those from Fraser Park, some of the females being less than half the size of the one sent to you

SUMMARY

The Australian species, lacking almost all closed cells in the anterior wing, are better referred to *Orussahains* and *Guiglia*, and *Orussus* and *Ophrynopus* are not represented in the Australian Fauna.

A study of the morphology reveals the archaic character of these wasps, and Innis is correct in regarding them as the relics of an ancient group.

The wasps are widely distributed over the world, and while nowhere plentiful, Rodd's observations tend to show that they are not so exceedingly rare as has hitherto been supposed, although, as McKeown observes, seldom seen in collections.

The large specimens, although much heavier than many bees, possess only four or five rather primitive hamuli, and this would appear to rule out the contention of Schwarz that the hamuli are correlated to body weight rather than wing power.

It is certain that the wasps are parasitic on the larvae of Buprestid beetles, but the specific hosts of *G. queenslandensis coronatus* and *O. normani* have not yet been determined, although that indicated for *O. wilsoni* is probably correct.

The Orussid wasps are undoubtedly an economic factor in controlling certain species of destructive wood-boring beetles, although their value is somewhat diminished by lack of numbers.

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TERTIARY FOSSILS OF DEEP LEAD AND WELCOME RUSH NEAR STAWELL, VICTORIA

By R. DAVIDSON
(F.N.C.V. Geology Group)

Tertiary fossils of marine origin were recorded from the township of Deep Lead, five miles north of Stawell, in the early mining days. In 1872 Mr. Bernard Smith, Warden and Police Magistrate of the district, found fossil shells at Welcome Rush, three miles north of Deep Lead, and in 1874 Mr. Norman Taylor, of the Geological Survey, obtained additional specimens from the same locality as well as at Poverty Hill, Deep Lead. The fossils, which occur in strata overlying auriferous gravel leads or gold drifts, were obtained by Mr. Taylor at Welcome Lead at a depth of 24 feet in a bore which reached bedrock at a depth of 74 feet and at Poverty Hill at depth in a mining shaft. The specimens were submitted to the late Professor McCoy, who identified, in addition to several genera of gasteropods, bivalves and corals, four species, viz.: *Nucula marthae* and *Tellina krausei*, extinct species of bivalves also common in the Balcombian beds at Mornington, *Ditrupa wormbeliensis*, a worm identical with that found in limestones at Wormhete Creek, and *Leprulia stawellensis* (McCoy), a new species of Polyzoa, the genus of which is common from Tertiary to Recent.

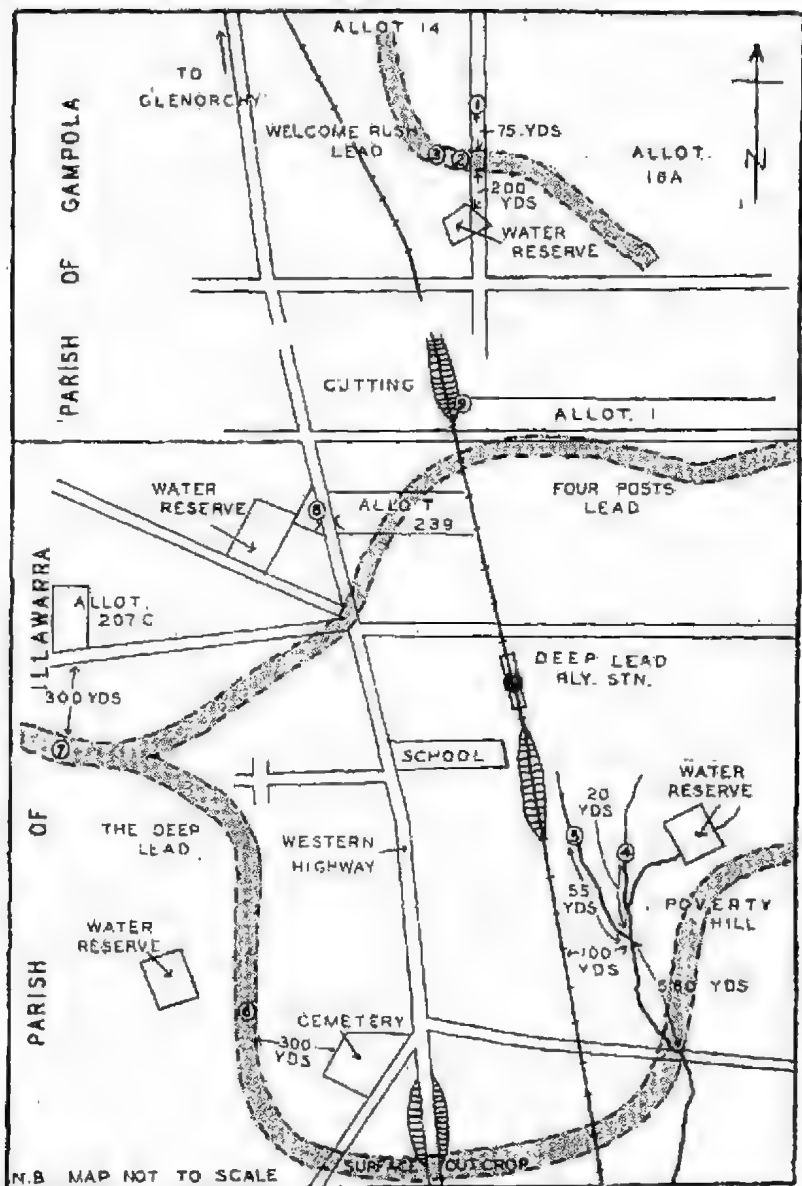
It is of interest to note that the original slab of sandstone—about 7 inches by 5 inches—in which Professor McCoy identified his four species is still carefully preserved and can be viewed in the National Museum, Melbourne. The late Frederick Chapinan, however, writing in the *Vict. Nat.* (Vol. XXI, No. 12, April 1905), after an examination of this specimen, questioned the naming of McCoy's four species.

Professor McCoy attached considerable importance to the discovery of these fossils because of their value in correlating the ages of the "gold drifts" of Victoria. (See *Report of Progress—Geological Survey*, Part II, 1874, and Part III, 1876.)

The auriferous leads of Deep Lead and Welcome Rush, together with those at Maude on the Upper Moorabool River, appear to be the only such leads in Victoria overlain with marine fossiliferous sediments. They are of probable Oligocene age and are known as the "Older Deep Leads," in contrast to the "Newer Deep Leads" elsewhere in Victoria which are overlain with non-marine sediments and which are regarded as being of Pliocene age.

During a recent visit to Deep Lead I located fossils at several points in the area. As I cannot trace any published record of fossils having been obtained since 1874 and as the localities mentioned in old records are not easy to identify—Welcome Rush is

not easily found and Poverty Hill is unknown locally—it is perhaps desirable to record their exact whereabouts. The accompanying sketch map with points of occurrence marked thereon should make identification easy.



Locality Map of places mentioned near Deep Lead, Victoria.

At localities marked 1, 2, and 3 on the map 1 obtained fossils on the spoil heaps of old mining shafts. Those at localities 1 and 2 appear to have come from bedded sediments, but those at locality 3 were obtained from ironstone concretions. At localities 4 and 5 rapid erosion in the beds of small watercourses in recent years has exposed fossiliferous strata *in situ*. At locality 4 specimens were obtained from large ironstone concretions of unsymmetrical shape about two feet in diameter; these concretions are embedded in clay and cemented ironstone conglomerate and appear to be in their original positions. At locality 5, however, a symmetrical fossiliferous concretion, about 18 inches by 12 inches, is exposed *in situ* in soft yellow sandstone, horizontally bedded. Although a little off the line of the gold lead, the sandstone at this point appears to rest on the Palaeozoic bedrock which outcrops on a slope a short distance away.

At localities 6, 7, 8 and 9, on old mine dumps, fossils were plentiful in ironstone concretions, all of which appear to have been associated with the soft yellow sandstone.

The Deep Lead fossils are small, and occur as casts and moulds in the ironstone concretions. At Welcome Rush the fossils are fragmentary as casts and moulds heavily cemented with iron; in a few specimens traces of the partly decomposed shells were still visible. The specimens collected were submitted to Mr. F. A. Cudmore, who kindly identified the following:

<i>Ditrupa wormbettiensis</i>	Common
<i>Lunulites rutella</i>	Common
<i>Turritello</i> sp.	
<i>Venericardia</i> sp.	
? <i>Leda</i> sp.	

Deep Lead is situated on a plateau approximately four miles by three miles in extent at an elevation of 750 feet above sea level and distant 155 miles north-west of Melbourne. The plateau is bounded along its northern margin by the Wimmera plains and on the east by a high ridge of Ordovician country. The sequence of strata overlying the gold leads appears to be as follows:

Youngest	Gray clay with buckshot (ironstone) gravel. Hard yellowish mudstone. Hard, mottled, bedded sandstone. Hard, dark-brown bedded ironstone.
Oldest	Soft, yellow, bedded sandstone.

The whole comprises a conformable series with a maximum thickness of about 90 feet. The upper sandstones and mudstones, which have not been proved fossiliferous, are exposed in two local railway cuttings and in general appearance resemble the Kalimnan sediments exposed in railway cuttings at Elsternwick, Melbourne.

The present topography gives no indication of the courses of the old buried streams of which the gold leads formed the beds and which in Oligocene times flowed north-westerly. The area was submerged probably towards the end of the Oligocene, and became an arm of the old Murray Gulf sea which extended eastwards into the Wimmera Plains. The sediments, which now cover the old stream system, were deposited on the bed of this ancient sea, and with relative uplift in Victoria emerged as dry land probably in Pliocene times.

WHAT WOOD IS THIS?

Part 2

By M. M. CHATTAWAY

(Reprinted from the C.S.I.R.O. Forest Products News Letter, No. 183)

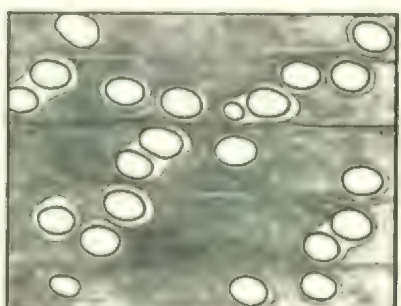
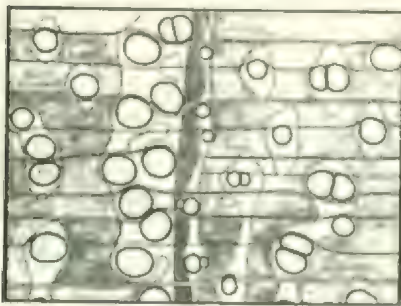
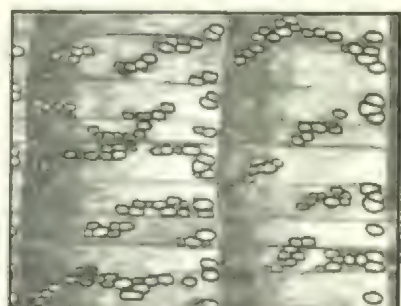
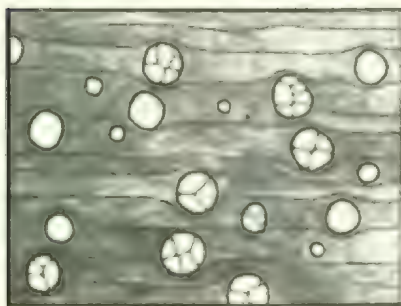
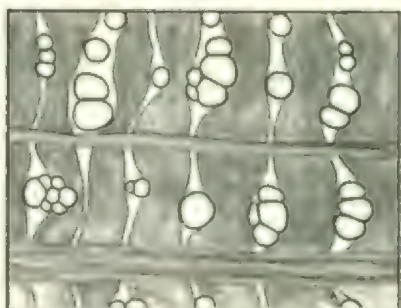
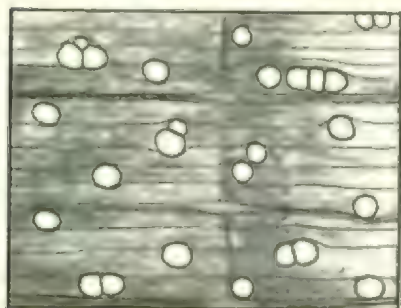
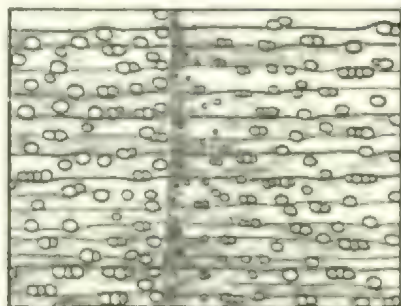
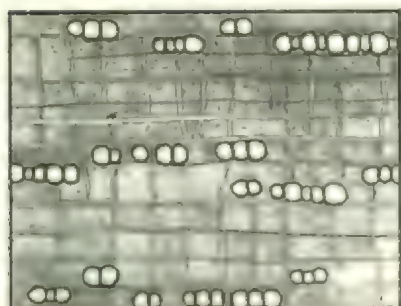
Anatomical Features

Wood is not a simple homogeneous material, but is made up of individual cells, which may occur as isolated units among other cells, or as a *tissue* composed of many similar units. These tissues form the vertical or radial conducting systems, the storage system and the ground mass which gives the tree trunk its strength to stay erect and provides us with the constructional material we call wood.

The main elements of which the wood is composed are the *pores* (the vessels), *rays*, *soft tissue* (parenchyma and tracheids) and the *fibres*. The details of the individual cells of which these tissues are composed can be seen when sections of wood are examined underneath a microscope, but a great deal of identification is done without recourse to sections or to high power magnification, and the details given in this series of articles are only those which can be seen with the naked eye, or with the help of a $\times 10$ hand lens. Particular care must be taken to make a clean cut on the cross surface of the wood, otherwise the pattern will be blurred instead of showing up clearly and sharply. The best way to secure this is to use a razor blade; if a knife is used, it must be kept very sharp indeed.

For purposes of identification the tissues are examined in two ways, first for details of their individual structure (e.g. size, number in a given area of the wood, etc.) and secondly for their arrangement in the wood and for the *pattern* which this arrangement gives on the cross surface of the timber. The patterns formed by different combinations of these tissues are very numerous and varied, and in many cases they are so distinctive that they tell at once to what botanical family a wood belongs. Woods of the pea family (blackwood, acacias) and the mahogany family (cedar, mahogany) have a very characteristic "family" pattern, and anyone who has come across them much, quickly comes to recognize them. In other families the patterns may be more commonplace and less distinctive, and in some woods the only thing that can be said of them is that they appear on first sight to be without any distinctive pattern, and a careful examination is needed to establish sufficient features to identify the wood.

Figures 1-8 show what is meant by the patterns that may be found in woods; the terms applied to them will be explained as they occur in the text.



Pores. On the cross surface of the wood the pores appear as circular or oval holes which may be empty of contents, or filled with deposits or tyloses. They are the cut ends of the vessels through which the nutrient solutions which form the food of the tree are carried vertically up the tree trunk. There is great variation in different species in number, size and arrangement of the pores.

Pore arrangement. The pattern that is formed by the pores on a cross surface of the wood is a useful diagnostic feature, and although minor variations occur, it remains fairly constant for any one species. Different arrangements are shown in the accompanying figures.

Pores absent. Some timbers are without pores; they are the true pines, Douglas fir, spruce, hemlock and other timbers known as "softwoods" in the trade. It should be understood however that many softwoods have pores and many non-pored timbers are hard, and it is for this reason that the terms "pored" and "non-pored" timbers are preferred to the older ones.

Ring-porous or semi ring-porous. This is a feature which only occurs rarely in Australian timbers, though it is extremely common among those of the Northern Hemisphere, where it is connected with the deciduous habit and the alternation of the cold winter season and the sudden burst of growth which occurs in the spring. A ring of larger pores may be formed at the beginning of each growing season and from these there is a marked diminution in size or number (or both) throughout each growth ring. (Figure 1.)

Pores predominantly solitary. (Figure 2) This term is used when at least 90 per cent of the pores are solitary, as in most of the eucalypts.

Radial multiples. When pores are grouped together they are often radially aligned, either with the common wall flattened (Figure 3) and the whole outline of the pore multiple somewhat similar to that of the solitary pores, or preserving the outline of the individual pores to give a chain-like appearance (Figure 4). It has been found that while many woods have short radial pore multiples of up to and including four pores (e.g. Queensland maple), there are relatively fewer woods with the longer radial pore multiples (e.g. yellow boxwood).

Pores in oblique arrangement. Pores are sometimes distributed with a definite oblique arrangement at an angle to the direction of the rays (Figure 5). This arrangement may occur with solitary pores or with pore multiples (e.g. eucalypts, oak, satin box). A variant of this which may occur when the pores are in multiples is described as "flame-like" (Figure 6).

Pores tangentially arranged. (Figure 7.) Pores may show a tangential instead of a radial pairing or multiplication; this feature is very characteristic of the silky oaks.

Pore clusters are irregular groups of contiguous pores which may lie tangentially arranged but are not necessarily so (e.g. silky ash).

Pore number is determined by pressing a cork borer or other metal tube of known area on to the clearly cut surface of the wood and counting the number of pores within it. Counts should be made on at least four widely

KEY TO ILLUSTRATION

- Fig. 1. Ring porous. Soft tissue aliform and confluent.
2. Pores solitary and containing tyloses.
3. Rays of two distinct widths.
4. Pores in radial multiples and in radial alignment.
5. Pores in oblique arrangement. Soft tissue surrounding the pores.
6. Pores in flame-like arrangement.
7. Pores in clusters and in tangential lines. Rays wider than the pores.
8. Pores small and evenly distributed.

separated areas and the mean obtained. On counting, the individual pores of a pore multiple or pore group must be counted separately. The classes commonly in use are as follows:

Few—Four or less per sq. mm. (e.g. mountain ash).

Moderately numerous—Between five and eleven per sq. mm. (e.g. grey persimmon, Queensland walnut).

Numerous—More than eleven per sq. mm. (e.g. myrtle beech).

It will be appreciated that where two woods are being compared, the variation that may occur in number must be taken into account. Thus a difference between 3 per sq. mm. and 5 per sq. mm. would not be, of itself, sufficient to distinguish the woods, but a difference of say 8 per sq. mm. and 20 per sq. mm. would readily do so.

Pore size. Like pore number, pore size will vary, not only between different species of timber, but between different specimens of the same species, and sometimes even between different parts of the same tree. This has to be allowed for in assessing the value of the feature in each wood examined. No attempt to give actual measurements is made but the classes are based on the visibility of the largest pores.

Large—Pores individually distinct to the naked eye (e.g. mountain ash, messmate).

Intermediate—Pores visible to the naked eye, but not individually distinct (e.g. tallowwood, blackbutt, spotted gum).

Small—Pores indistinct to the naked eye, but clearly visible with a lens (e.g. yellow carabeen).

Very small—Pores indistinct, even with a lens (e.g. sandalwood, leatherwood).

Tyloses common. (Figure 2.) Tyloses are ingrowths into the vessel cavity; they are commonly formed when sapwood starts to change into heartwood, but they may also be produced in the sapwood as a result of injury. Owing to their sporadic occurrence the fact that they are absent from a wood has no significance, but when they are very conspicuous either because of the thickness of their walls, or because of their abundance, they become a useful diagnostic feature of the wood. They usually glisten on the cross surface (e.g. many of the eucalypts).

White or yellow deposits common. Deposits may fill every pore, but usually they are sporadic in occurrence (e.g. saffron heart, turpentine, red silky oak).

A FANTASY IN COLOUR

Half a dozen yellow-winged honeyeaters, all with a single thought—to obtain honey from the flowers of a Rosemary Grevillea (*G. rosmarinifolia*) in the writer's garden, recently made a very beautiful picture. The bright yellow wing feathers and lively movement of the honeyeaters as they flitted backwards and forwards from two adjacent trees to the grevillea provided an ideal foil for the profuse red and cream flowers and more sombre green foliage of the grevillea. Incidents such as this bring great happiness to any true nature lover.

—A.E.H.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, November 12, 1951. The President, Mr. E. E. Lord, was in the chair and about 200 members and visitors attended.

Mrs. O. Glenie, Messrs. R. Perrin and N. R. Draeger were elected and welcomed as Ordinary Members. Nominations were received on behalf of the following: as Ordinary Members, Miss Thelma Crawford, 3rd Floor, The Block, Collins Street, Melbourne, C.1 (Miss M. L. Wigan/Miss N. Fletcher), Dr. H. Wettenhall, 14 Parliament Place, Melbourne, C.1 (Dr. R. R. Wettenhall/Mr. E. E. Lord) and Mr. W. H. Miller, 59 Park Street, South Yarra, SE.1 (Mr. E. E. Lord/Mr. F. Lewis).

Mr. Dickins briefly reported on the excellent Show recently held by the Junior Field Naturalists in the Hawthorn Town Hall.

The President commented on the very successful Club Picnic held at Lakeside, Emerald, on Cup Day.

The speaker for the evening was a member of the Club, Mr. J. H. Willis. A graphic and very interesting account of the 1950 Expedition led by Mr. J. Bechervaise to the Archipelago of the Recherche was given by Mr. Willis, who was the Botanist of the party. Excellent slides and a film illustrated the address. Members showed their appreciation with hearty applause.

The meeting concluded at 9.40 p.m.

EXHIBITS

FLOWERS: Garden-grown native flowers, Mr. J. Seaton, Mr. P. Fisch, Mr. I. Hammet, Mr. A. Chalk, and Mr. R. Savage. Eight specimens grown by Mr. Mindor, Horsham, were exhibited by Miss E. C. Carberry.

Snowy Mint Bush (*Prostanthera nivea*): a piece from the only bush recorded as growing in a native state at Sandringham, Mr. A. E. Brooks.

'Myrtle' Beech (*Nathofagus cunninghamii*) specimen with fruits from a tree approximately 11 years old, garden grown at Croydon, Mr. T. S. Hart.

ORCHID: *Sarcophyllus australis*, Gum's Orchid from Yinnar, Mr. A. Jeunison.

PHOTOS: Collection of photos of wild flowers, Mr. R. D. Lee.

FOSSIL: Ammonite (Cretaceous), Mr. D. Davidson.

EURYPTERIDA—SCORPIONS OF THE SEA

A GLIMPSE INTO THE OCEANS OF THE DISTANT PAST

By EDMUND D. GILL

Palaeontologist, National Museum, Melbourne

We all have a lot to do with arthropods, because there is probably not one of us who has not chased a fly, eaten crayfish, and been attacked by an ant! Arthropods are found fossilized throughout the fossil-bearing strata, which represent a period of about 500,000,000 years, as measured by the radio-active minerals. They possess exoskeletons, bearing their hard parts on the outside of their bodies, and not inside as we do. Arthropods are animals that throw their skeletons away, because when they grow they cannot be contained in their hard casing, which they therefore have to moult and develop a new one. Of great interest are the *Eurypterida*, which thrived throughout Palaeozoic time, and included the largest arthropods that ever lived, in either past or present. Their heyday was in Silurian and Devonian times, and remains of these beasts have been found in Victoria and New South Wales.

NATURE'S RECORD IN THE ROCKS

The strata of the earth are pages in Nature's book of world history, and the fossils are the illustrations that enable us to visualize the life of each succeeding geological age. If we study this book at the page called Silurian, we discover a world completely different from our own. Rocks of Upper Silurian age in New South Wales, Victoria and Tasmania tell much of the natural history of those times, and provide us with a very satisfactory peep into the past.

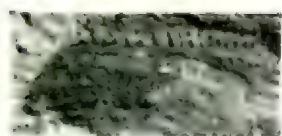
DESCRIPTION OF PLATE

1. Fragment of eurypterid showing spinose margin, $\times 7$.
2. Joint of paddle leg of *Hughmilleria* sp. from Cootamundra, N.S.W., $\times 2$.
3. Tergite of same, $\times 2$. See also text figure 1.
4. Piece of skin of same showing typical scales, $\times 6$.
5. Photograph of cast in National Museum, Melbourne, of *Stylomurus scoticus* Woodward from the Old Red Sandstone of Forfar, Scotland. The ruler on the specimen is 15" long. It is a good example of a large eurypterid, being about 3' 4" long; *Pteryonatus australis* McCoy was about 2' 6" long.

Photographs 1-4 are by Mr. L. A. Baillôt of the Melbourne Technical College, and the other by the author.

N.B.: Specimens shown in figures 1-3 of *Hughmilleria* from Cootamundra are the property of Mr. W. E. Williams of Cootamundra, who advises me that he is donating them with the rest of his collection to the Commonwealth collection at Canberra. The specimen shown in 4 is registered number P15366 in the National Museum collection, Melbourne. All specimens are from Church Hill, Cootamundra.

PLATE VI

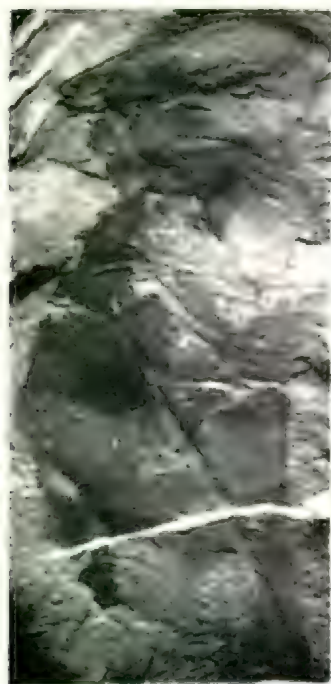


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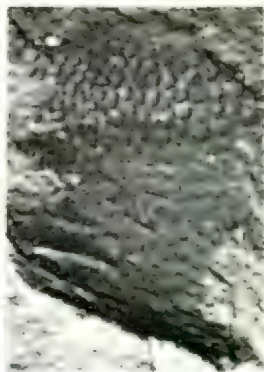
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The land surface was apparently largely bare, but in the swampy areas round the river mouths there grew plants called *Baragwanathia*, *Varravia*, *Hedeia*, *Zosterophyllum* and *Sporogonites* (Cookson 1935, 1945, Gill 1951), none of which reached probably any greater height than 18 inches. In the sea, plants were common, and there were very numerous animals. In Australia no bony fish have been found in Silurian rocks, although such occur in many other parts of the world; they appear to have migrated later into this area. Mollusca were numerous in both species and populations, both solitary and reef corals thrived, and bryozoa were common. Graptolites, sponges, foraminifera, annelids and echinoderms were well represented. Among the arthropods, trilobites, ostracods and eurypterids (here claiming our special attention) were numerous in their own ecological settings.

ARCHITECTURE OF EURYPTERIDS

These sea-scorpions, as they are often called, had elongate segmented bodies covered with a thin chitinous exoskeleton, with tubercles of fine scale-like markings (Pl. VI, fig. 4). These marks are places where the chitin was thicker, and they may well have been places of muscle attachment. The front part of the carapace was the cephalothorax, comparatively short in eurypterids, and bearing median ocelli and two large crescentic lateral eyes. Six pairs of appendages attached thereto included strong pincers or chelicerae. The abdomen had 13 segments, six making up the mesosoma, and six plus tail or telson forming the metasoma. The first mesosoma segment carried the genital operculum, while the others had broad leaf-like appendages, which no doubt were breathing organs. It is interesting to compare these with the operculum and book of gills in the king-crab *Limulus*, and with the book of lungs of spiders.

Most of the Eurypterids were but a few inches long, but some were huge (Pl. VI, fig. 5), the largest measuring 9 feet from end of outstretched pincers to tip of tail. It could give a nasty nip!

PRIVATE LIFE OF EURYPTERIDS

Their diet seems to have been marine worms, and perhaps some small fish. They were bottom-living beasts, but the development of paddles by some indicates that they at least must have done some swimming too. There has been a lot of argument as to whether eurypterids were freshwater, brackish water, or truly marine animals (see O'Connell 1916). The Australian occurrences seem to favour the idea that they lived in the estuaries or rivers.

The tiny, newly-hatched eurypterids looked like their parents, but had relatively larger eyes, fewer body segments, and less differentiation of mesosoma and metasoma.

AUSTRALIA'S EURYPTERIDS

In 1899 Professor McCoy described *Pterygotus australis* from a piece of eurypterid skin found in Melbourne, and unfortunately all the remains of these animals found in Australia of which the writer has knowledge are likewise fragmentary. In 1935 Dr. Isabel Cookson recorded eurypterid remains along with land plants at Mount Pleasant in Victoria, and the writer has collected them from the 19-mile quarry on the Yarra Track, a famous plant locality (Gill 1941). This association of land plants and eurypterida is probably significant, the former floating down the rivers into the estuaries where the latter lived.

In 1936 Professor Sir Edgeworth David and Dr. Tillyard published a memoir on late Pre-Cambrian fossils from South Australia and described alleged eurypterid-like remains, but the specimens are very doubtful and are perhaps best accommodated in the category of the "not proved".

Some years ago, Mr. W. E. Williams of Cootamundra, N.S.W., sent from that town a collection of fossils to the author, and from it a new trilobite was described (Gill 1940). The fauna is an unusual one, apparently being affected by estuarine conditions: eurypterid remains and land plants are once again associated. Hereunder these fragments are recorded and some comments made on *Pterygotus australis*.

Class	MEROSTOMATA	Woodward 1866
Sub-Class	EURYPTERIDA	Burmeister 1843
Family	HUGHMILLERIIDAE	Kjellesvig-Waering 1951
Genus	HUGHMILLERIA	Sarle 1903

Hughmilleria sp.

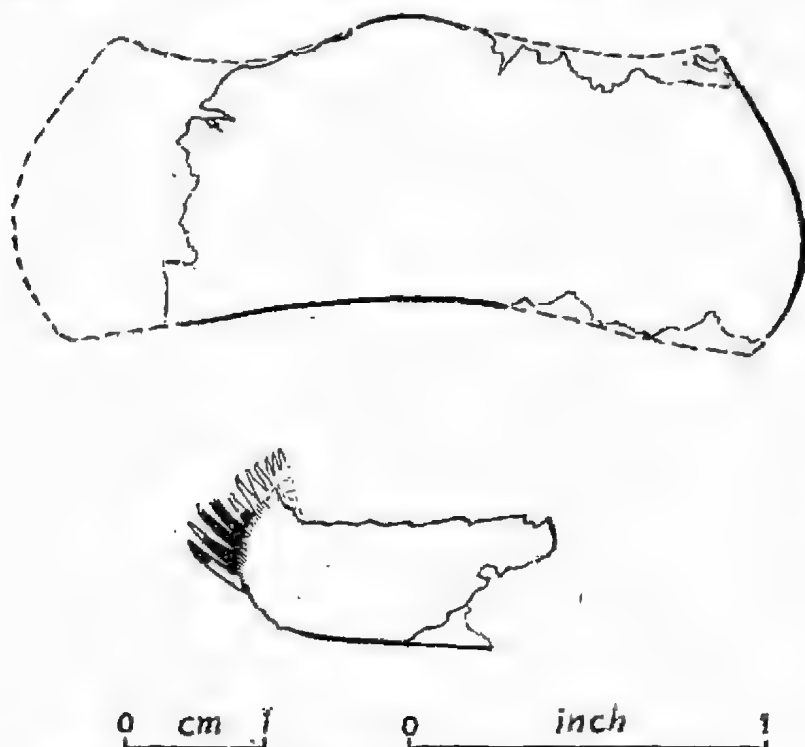
Pl. VI, figs. 1-4; Text fig. 1.

The Cootamundra eurypterid probably belongs to the genus *Hughmilleria*, the members of that family having spines or spurs on their walking legs, while the *Pterygotids* are devoid of them (Kjellesvig-Waering 1951). Like other eurypterids it had a very thin skin, but was small, not exceeding 9 inches in length. In this it contrasts with *Pterygotus australis*, which was of the order of 2 ft. 6 in. long!

From Cootamundra there is figured (Pl. VI, fig. 3) a tergite, which although incomplete can be restored with some accuracy (text fig. 1). Anteriorly it has a slightly furrowed border about three-quarters of a millimetre wide. The typical semilunar scales of this genus are seen on the forward part of the tergite. Another fragment of interest is the coxal joint of a walking leg (text fig. 1) preserving eleven backwardly curved teeth on the gnathobase, decreasing in size posteriorly. The plate shown in Pl. VI., fig. 2, with the spurs around the outer edge is probably a basal joint of

a paddle leg. There is figured in addition an interesting fragment with a fringe of fine spines (Pl. VI, fig. 1).

There is evidence of another form at Cootamundra but the specimens in hand are too meagre for description.



Above: Tergite of *Hughmilleria* sp. from Cootamundra, N.S.W.

Below: Coxa of same.

Family	PTERYGOTIDAE	Clarke and Ruedemann 1912
Genus	<i>Pterygotus</i>	Agassiz 1839
Species	<i>Pterygotus australis</i>	McCoy 1899

When McCoy described his species, the genus *Hughmilleria* had not been established, and *Pterygotus* had a very broad connotation. However, it is very difficult with the fragmentary material available to say to what genera the pieces belong, but as far as one can tell *P. australis* is best accommodated at present in the genus to which it was originally referred. On examining the type specimen, it has been noted that there is an anterior border half a centimetre wide, and that a small fraction of the posterior edge of the tergite has been preserved. This permits the length of the segment to be

measured, which is 7 cm. On comparing this with a large and more or less complete *Pterygotus* figured by Clarke and Ruedemann (1912), it is clear that *Pterygotus australis* must have been about 70 cm. or 2 ft. 6 in. long. The scale-like markings of the tergite are on the anterior part only, as with the *Hughmilleria* from Cootamundra. The holotype counterparts are Reg. Nos. P577 and 1085 in the National Museum, Melbourne; on the former is a note saying that the specimen was collected by Mr. F. P. Spry from the main sewer in Domain Road, South Yarra, at a depth of 103 ft., and was presented to the Museum 16.8.95.

In 1910 Chapman recorded in this journal further finds of *Pterygotus australis* from the Yarra Improvement Works, and in 1914 figured the type specimen in his *Australasian Fossils*. In 1928 the same author described minute gasteropods attached to the carapace of *Pterygotus australis*, and these he named *Capulus melbournensis*. In the same way Sarle (1903) has described *ostracods* attached to the carapace of *Eurypterus pittsfordensis*. Finally, David and Browne (1950) have commented that "the large eurypterid *Pterygotus australis* was the most highly organized form of life known to have inhabited the Silurian seas of the Commonwealth."

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A TRIP TO MOUNT ECCLES (VIC.)

By NOEL E. LEARNORTH.

Some members of the Portland Field Naturalists Club had a field day at Mount Eccles, 28 miles north-east of Portland, on September 2. The Mount, 524 feet above sea level, is an extinct volcano with a deep crater lake nearly a mile long and a quarter of a mile wide. The area is very picturesque, full of interest to naturalists, and a proclaimed wild life sanctuary. Geologically, it belongs to a line of extinct volcanoes, including Mounts Vandyke, Deception and Eckersley, north of Portland, which began erupting in Lower Pleistocene times. The lava stream from Eccles south through Tyrendarra is said to be the youngest flow in the State. Incidentally, the mount should be Eels, named thus by Mitchell in 1836 after a Peninsular War companion, and later corrupted to Eccles.

Besides the main crater there is a small one to the south-east and several perpendicular holes on the top of lava mounds. One interesting phenomenon is a natural bridge of solid rock which carries a road over a deep 20 ft. wide volcanic cleft.

The sides of the crater valley are covered with Manns Gums (*E. viminalis*), some Blackwoods (*A. melanoxylon*) and a thick growth of Common Bracken and rushes. Perpendicular cliffs of basalt and tuff and large boulders heaped at the foot thereof are an ideal home for lichens, liverworts, moss and ferns, of which we made a good tally. One of our members collected 40 mosses during the day.

One fern in particular was of great interest, i.e., the Bristle Fern (*Polystichum venosum*), not previously recorded in western Victoria. N. A. Wakefield, *Vic. Nat.*, Nov. 1941, says: "This fern is epiphyte on tree-fern trunks from Cape Otway to East Gippsland." The Mount Eccles specimens were growing on the dripping wet walls of a basalt cave in almost complete darkness. It is a large colony and that it has escaped the notice of hundreds of tourists in the last fifty years is hard to believe.

Other ferns recorded were some very fine specimens of Blanket Fern (*Pleurosorus rufifolius*), among which were clumps of Maroonhood Orchids (*Pterostylis pedunculata*), Common Maidenhair (*Adiantum aethiopicum*), Tender Brake (*Pteris tremula*), Common Shield Fern (*Polystichum aculeatum*), Necklace Fern (*Asplenium flabellifolium*), Delicate Rue Fern (*Anogramma leptophyllum*), Rock Lip Fern (*Chalcidanthus tenuifolia*), Sickie Fern (*Pillaea falcata*), and, deep down in an inaccessible cave, fine growth of what we judged to be Shiny Wood Fern (*Dryopteris shepherdii*).

In birds we listed 36 species, including Corella (*Kakatoe tenuirostris*), Brown Bittern (*Butorinus poeciloptilus*) and Calamanthus. Any member of the F.N.C.V. would find a day at Mount Eccles one well spent.

JUNIOR FIELD NATURALISTS CLUB EXHIBITION

This was held at Hawthorn Town Hall on November 3 and 4. It was a good display, covering a wide variety of Natural History subjects, including specimens of marine life, insects, flowers, trees, minerals, live toads, shells and rocks.

It was unfortunate that examinations prevented some of the expected school children attending, but the juniors are to be congratulated on their enterprise in undertaking the Show and the excellent manner in which the exhibits were presented.

EXCURSION TO BENDIGO—WHIPSTICK AREA

Twenty-seven club members, travelling by parlour coach, attended the Bendigo excursion on August 25, under the leadership of the active Bendigo branch. The Whipstick is an auriferous formation consisting of low sand hills jumbled together almost without order. Though the area possesses no permanent water, profitable gold has been worked by early prospectors.

Our first stopping place was Eaglehawk, where along the road the Green Mallee (*Euc. viridis*) is the dominant timber. We walked up a small rise, negotiated a fence, and in an open clearing of about four acres a feast was presented to our eyes. The taller shrubs were the brown-flowered *Dryas ulicina* and pink spiked *Boronia dentigera* (syn. *B. anemonifolia*), with a richly coloured ground cover of rosy *Baeckea ramosissima*, chalk white *Eriostemon abrotalis*, starry white-flowered *Eriostemon diffusus*, the dainty violet of *Hybanthus floribundus* and, in sheltered places, drifts of *Cudrania corallina* with the largest flowers I have ever seen of this species. Though the area in general is poor in orchid species, the rich yellow and brown *Diuris maculata* was here in large numbers.

The second stop presented to our eyes the August raiment of *Acacia hakeoides*. Truly living gold in a gold-bearing area. Overshadowed by his larger brother but very worthy of notice were the flat-topped golden mounds of *Acacia sclerophylla*. Red ironbark (*Euc. Sideroxylon*) was the dominant timber. A few bushes of *Leptomeria aphylla* in fruit were seen.

Flagstaff Hill was the third stop, where *Phobalium obtusatum*, a rarity of Victorian flora, occurs. *Euc. viridis*, *Casuarina lepidophloia*, *Persoonia viridis*, *Baeckea ramosissima* and *Grevillea longifera* grow here. A small party of the tawny-crowned Honeyeater (*Gliciphila melanops*), a characteristic feature of the Whipstick, was observed. More often the bird is unseen, only a doleful song informing the observer of its presence. Of special interest was the dead body of a Spotted Nightjar (*Eurostopodus guttatur*), which has been presented to the Museum.

As we travelled to Huntly North, Mr. H. Stewart a regular visitor to the area, remarked on the bushes of *Olearia teretifolia*, whose purity of colour, tallness of growth and general neatness he declared was the best for years.

At Huntly North we had tea amongst a large area of *Acacia hakeoides* invading former sheep pastures. Of the *Acacia hakeoides* association the following lichens and mosses were seen, many of the lichens being vividly coloured. Small pieces of stone were covered with wiry, spiderly *Cladonia aggregata* with streaks of vivid orange supplied by the diminutive *Amphilemma murorum*. On the ground were greyish silver patches of *Parmelia conspersa* and dark olive-green *Parmelia imitatrix*.

The most conspicuous moss was the huge yellow-green cushions of a *Barbula* sp., and a new record for the area, *Crimmia pulvinata*, was found.

Bird list supplied by Mr. H. Stewart—En route: Black-backed Magpie, Magpie-Lark, White-fronted Heron, Willie Wagtail, Raven, Nankeen Kestrel, Welcome Swallow, Black Duck, Pied Currawong. Nearer Whipstick, vicinity of Flagstaff Hill: dead Spotted Nightjar picked up, three Wood Duck seen flying overhead, Tawny-crowned Honeyeaters heard calling, Wattle Bird, Yellow-tailed Pardalote, Noisy Miner, Blue Wren. Huntly North: Hooded Robins, pair probably nesting, Spur-winged Plover, Gilbert Whistler heard calling, Black-faced Cuckoo-Shrike, Crested Bell-bird, Regent Honeyeater, Eastern Rosella, Grass Parrot, Bronzewing Pigeon, and partially built nest of Noisy Miner, about five feet from ground.

K. W. ATKINS.

THE GENERA OF VICTORIAN MOSSES, AND NEW RECORDS OF SPECIES FOR THE STATE

By H. T. CLIFFORD and J. H. WILLIS

Introduction

Mosses are among the easiest and most fascinating of plants to collect, are simply dried, and many hundreds of packets can be kept in a small space. They provide an infinite variety of form and many are exceedingly beautiful, although needing microscopic investigation to reveal their delicate structures. Many genera and even species are cosmopolitan and so, if the collector travels widely, he does not have to learn an entirely new flora for each locality. These qualities compensate in part for the difficulty that the amateur will experience in naming his specimens.

There is no "*Moss Flora*" for Victoria, but most of the genera commonly met in this State are included in H. N. Dixon's *Handbook of British Mosses* and his important "Studies in the Bryology of New Zealand" (*Bulletin 3, N.Z. Institute, 1913-1929*), also in the moss monograph "*Tasmanian Bryophyta*" by L. Rodway (in *Papers and Proceedings of the Royal Society of Tasmania, 1913/14*). If a genus cannot be found in either of these works, then the two moss volumes of Engler and Prantl's *Pflanzen familien* (1924) must be consulted. This very fine illustrated monograph by V. F. Brotherus of the *Musci* of the world will be of limited use to those who cannot read German. For the enthusiast who wishes accurately to determine species, however, much painstaking research will be necessary. Synonymies have not yet been worked out fully, but it appears that of the 600 "species" already recorded for Victoria no more than 300 (and probably less) are tenable.

While identifying mosses, the authors have recently come across a number of species that had never been listed for Victoria, and in several instances these belonged to genera that were also unrecorded (although known from either New South Wales or Tasmania). The last attempt at a census of Victorian *Musci* was that of W. W. Watts and T. Whitelegge in *Census Muscorum Australiensium, 1902/5* (a supplement to *Proceedings of the Linnean Society, N.S.W.*); but unfortunately this useful compilation covered only the acrocarpous mosses of the Commonwealth, and much critical work (involving Australian species) has been done since—particularly by G. O. K. Sainsbury at Wairoa, New Zealand. It seems desirable therefore to publish all known records of mosses new to Victoria—with habitat and other data—and in this connection we have to thank Messrs. Sainsbury (N.Z.) and Bartram (Pennsylvania) for checking the identities of species that were open to doubt. In a few instances (e.g. *Bryobartramia Robbinii*) the records had been published, but only during the past decade and in overseas journals which are not readily available to the

Australian student; hence we think it advisable to include these with the entirely new records.

Certain mosses have been credited to Victoria on the basis of such vague localities as *Australian Alps* (which is more likely to mean the Kosciusko region, N.S.W.) *Gippsland* or simply *Australia Felix*. It is hoped later to prepare a list of these unsatisfactory records, indicating which ones have been validated by re-discoveries actually within Victoria during recent years.

The literature in which generic subdivisions and changes occur is mostly scattered and difficult of access. Moreover, since we are now putting forward a number of genera not previously recognized from Victoria, it has been decided also to publish a complete list of the State's moss genera (123, as at present accepted, of which 70 or 57% are common to Britain). Future workers will then have a reliable starting point from which to make other generic records, as our bryophyte flora becomes investigated more intensively.

ALPHABETICAL ARRANGEMENT OF VICTORIAN MOSS GENERA

(Notes: After the authority for each genus, an abbreviated family name is given in parenthesis, the customary suffix—*-neæ* or—*-iaceæ* being omitted for convenience. Names in italic type represent those genera which have appeared in important 20th Century works on bryology, but which are now relegated to synonymy or replaced by other genera (as regards Australian species once referred to them). The exigencies of space preclude a complete list of all the generic synonyms that have ever been applied to Victorian Musci. The asterisk signifies a genus common to Britain, and the prefixing † a new generic record for Victoria.)

- | | |
|--|---|
| <i>Acanthocladium</i> Mitt. (<i>Semato-</i>
<i>phyll.</i>) | * <i>Bryum</i> Hedw. (<i>Bry.</i>) |
| * <i>Acaulon</i> C.M. (<i>Pott.</i>) | <i>Calypogon</i> Mitt. (<i>Pott.</i>) |
| * <i>Acrocladum</i> Mitt. (<i>Amblysteg.</i>) | <i>Camptochaete</i> Reichdt. (<i>Lembo-</i>
<i>phyll.</i>) |
| * <i>Alcina</i> Kindb. (<i>Pott.</i>) | <i>Campylopodium</i> p.p. = |
| <i>Amblystegium</i> p.p. = <i>Lepto-</i>
<i>dictyum</i> | <i>Trematodon</i> |
| * <i>Amphidium</i> Nees em Schp. : | * <i>Campylopus</i> Brid. (<i>Dicran.</i>) |
| (<i>Dicran.</i>) | <i>Catagonium</i> p.p. = <i>Eucatagonium</i> |
| * <i>Andreaea</i> Hedw. (<i>Andreaea</i>) | <i>Catharinaea</i> = <i>Atrichum</i> |
| †* <i>Archidium</i> Brid. (<i>Archid.</i>) | * <i>Ceratodon</i> Brid. (<i>Ditrich.</i>) |
| * <i>Astomum</i> Hampe (<i>Pott.</i>) | * <i>Conostomum</i> Schrad. (<i>Bartram.</i>) |
| * <i>Atrichum</i> P.Beauv. (<i>Polytrich.</i>) | † <i>Cratoneurosis</i> (Broth.) Fleisch.
(<i>Amblysteg.</i>) |
| * <i>Barbula</i> Hedw. (<i>Pott.</i>) | * <i>Cryphaea</i> Mohr (<i>Cryphaea</i>) |
| * <i>Bartramia</i> Hedw. (<i>Bartram.</i>) | <i>Cyathophorum</i> P.Beauv. (<i>Hypo-</i>
<i>pteryg.</i>) |
| * <i>Bartramidula</i> B. & Schp.
(<i>Bartram.</i>) | <i>Cyrtodon</i> = <i>Cryphaea</i> |
| * <i>Blindia</i> B. & Schp. (<i>Seliger.</i>) | †* <i>Daltonia</i> Hook. & Tayl.
(<i>Hooker.</i>) |
| <i>Brachymenium</i> Schwgr. (<i>Bry.</i>) | <i>Dawsonia</i> K.Br. (<i>Dawson.</i>) |
| * <i>Brachythecium</i> B. & Schp. (<i>Brac-</i>
<i>hyther.</i>) | * <i>Desmatodon</i> Brid. (<i>Pott.</i>) |
| * <i>Brentelia</i> Schp. (<i>Bartram.</i>) | <i>Dicnemoloma</i> Ren. (<i>Dicran.</i>) |
| <i>Bruchia</i> Schwgr. (<i>Dicran.</i>) | * <i>Dicranella</i> Schp. (<i>Dicran.</i>) |
| † <i>Bryobartramia</i> Sainsbury (<i>Bryo-</i>
<i>bartram.</i>) | <i>Dicranum</i> p.p. = <i>Dicranoloma</i> |
| | <i>Dicranoloma</i> Ren. (<i>Dicran.</i>) |

- Didymodon* Hedw. (*Pott.*)
Distichophyllum Doz. & Molk. (*Hooker.*)
**Ditrichum* Hampe (*Ditrich.*)
**Drepanocladus* (C.M.) Roth. (*Amblysteg.*)
Eccremidium: Hook.f. & Wils. (*Ditrich.*)
Echinodium Jur. (*Echinod.*)
**Encalypta* Hedw. (*Encalypt.*)
**Ephemerum* Hanke (*Ephemer.*)
†Eriopus (Brid.) C.M. (*Hooker.*)
Eucamptodon Mont. (*Dicranum.*)
Eucatagonium (Broth.) Fleisch. (*Phyllogom.*)
Fabrouia Radd. (*Phycom.*)
**Fissidens* Hedw. (*Fissident.*)
**Funaria* Hedw. (*Funar.*)
Gigaspermum Lindb. (*Gigasperm.*)
Glyphomitrium p.p. = *Ptychomitrium*
Glyphothecium Hampe (*Ptychomn.*)
Goniobryum Lindb. (*Rhizogon.*)
**Grimmia* Hedw. (*Grimm.*)
**Gymnostomum* Hedw. (*Pott.*)
**Hedwigia* P.Beauv. (*Hedwig.*)
Hedwigidium = *Hedwigia*
Holomitrium Brid. (*Dicran.*)
Hymenodon: Hook.f. & Wils. (*Rhizogon.*)
Hyophila p.p. = *Hymenostomum*
Hypnodendron (C.M.) Lindb. (*Hypnodendr.*)
**Hypnum* Hedw. (*Hypn.*)
Hypopterygium Brid. (*Hypopteryg.*)
**Isopterygium* Mitt. (*Hypn.*)
Lembophyllum Lindb. (*Lembophyll.*)
**Leptobryum* Wils. (*Bry.*)
**Leptodictyum* (Schp.) Warnst. (*Amblysteg.*)
Leptodontium p.p. = *Trisetrella*
Leptostomum R.Br. (*Leptostom.*)
Leptotheca Schwgr. (*Aulacomn.*)
Lepyrodon Hampe (*Lepyrodont.*)
**Leucobryum* Hampe (*Dicran.*)
Lophidium = *Hypopterygium*
Macromitrium Brid. (*Orthotrich.*)
**Meesia* Hedw. (*Mees.*)
Mesochete Lindb. (*Rhizogon.*)
Meteorium Doz. & Molk. (*Meteor.*)
**Mielichtotelia* Hornsch. (*Bry.*)
†Mittenia Lindb. (*Mitten.*)
Mniobryum (Schp.) Limpr. (*Bry.*)
Mniodendron Lindb. (*Hypnodendr.*)
†Mniun Hedw. (*Mni.*)
**Neckera* Hedw. (*Necker.*)
**Octodiceras* Brid. (*Fissident.*)
**Orthodontium* Schwgr. (*Bry.*)
**Orthotrichum* Hedw. (*Orthotrich.*)
Oxyrrhynchium p.p. = *Platyhypnidium*
Papillaria (C.M.) C.M. (*Meteor.*)
**Phascum* Hedw. (*Pott.*)
**Philonotis* Brid. (*Bartram.*)
**Physcomitrium* Brid. (*Funar.*)
**Physcomitrella* B. & Schp. (*Funar.*)
**Plagiothecium* B. & Schp. (*Plagiothec.*)
†Platyhypnidium Fleisch. (*Amblysteg.*)
**Pleuridium* Brid. (*Ditrich.*)
**Pogonatum* P.Beauv. (*Polytrich.*)
**Pohlia* Hedw. (*Bry.*)
Polytrichadelphus (C.M.) Mitt. (*Polytrich.*)
**Polytrichum* Hedw. (*Polytrich.*)
**Pottia* Fürnr. (*Pott.*)
†Pseudoleskea (Lesk.)
Psilopilum Brid. (*Polytrich.*)
Pterygophyllum Brid. (*Hooker.*)
**Ptychomitrium* Fürnr. (*Ptychomit.*)
Ptychomnion Hook.f. & Wils. (*Ptychomn.*)
Rhacocarpus Lindb. (*Hedwig.*)
**Rhacomitrium* Brid. (*Grimm.*)
Rhacopilum P.Beauv. (*Rhacopil.*)
Rhaphidorrhynchium Besch. (*Sematophyll.*)
Rhaphidostegium = *Sematophyllum*
Rhizogonium Brid. (*Rhizogon.*)
**Rhodobryum* (Schp.) Limpr. (*Bry.*)
Rhynchostegium B. & Schp. (*Brachythec.*)
†Rhynchostegiella (B. & Schp.) Limpr. (*Brachythec.*)
Saulonia (Hook.f. & Wils.) Mitt. (*Hooker.*)
Schizophascum = *Pottia*

- Schlotheimia Brid. (*Oethotrich.*)
Scleradontium = *Dicnemoloma*
 **Sematophyllum* Mitt. (*Sematophyll.*)
 †*Sphagnum* L. (*Sphagn.*)
Stereodon p.p. = *Hypnum*
Streptopogon p.p. =
Calyptopogon
 **Tayloria* Hook. (*Splachn.*)
Tetrapterum Hampe in C.M.
 (Pott.)
 †*Tridentium* Hook.f. (Pott.)
 †**Thamnum* B. & Schp. (*Necker.*)
- **Thuidium* B. & Schp. (*Thuid.*)
Thuidiopsis = *Thuidium*
 **Portella* (C.M.) Limpr. (Pott.)
 **Tortula* Hedw. (Pott.)
Trachyloma Brid. (*Pterobry.*)
 †**Trematodon* Michx. (Dicran.)
Trichostomum p.p. = *Didymodon*
Triquetrella C.M. (Pott.)
 **Ulotia* Brid. (*Orthotrich.*)
 **Weissia* Hedw. (Pott.)
Weymouthia Broth. (*Metzger.*)
 **Zygodon* Hook. & Tayl.
 (Orthotrich.)

PRINCIPAL LITERATURE CONCERNING VICTORIAN MOSSES

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2. Hampe, E.—"Plantæ Muellerianæ—Musci Frondosi in Australia Felici lecti" (*Linnaea* 28: 203—215, 1856; 30: 623—646 1859/60; 36: 513, 1870).
3. Mitten, W.—"A List of Musci and Hepaticæ collected in Victoria, Australia, by Dr. F. Mueller" (*Hooker's Journal of Botany* 8: 257—265, 1856).
4. Mitten, W.—"Australian Mosses" [an enumeration, with localities] (*Proc. Roy. Soc. Vic.* 19: 49—96, 1883).
5. Mueller, F.—*Second General Report of the Government Botanist*, 1854, p. 17 [a list of 70 moss species]; *Annual Report of the Government Botanist*, 1858, p. 12 [a list of a further 72 moss species].
6. Mueller, F.—*Analytical Drawings of Australian Mosses* Fasc. 1, 1864 [incl. 14 Victorian species].
7. Watts, W. W. & Whitelegge, T.—"Census Muscorum Australiensium" (Supplement to *Proc. Linn. Soc. N.S.W.*) 1902, pp. 1—90: 1905, pp. 91—163. [Acrocarpous mosses only listed systematically, with localities].
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(To be Continued.)

KANGAROO ISLAND IN EARLY SPRING

By J. S. SEATON, Caulfield

On September 3rd, 1951, I had the pleasure of accompanying Mr. F. C. Payne of Adelaide on a trip to Kangaroo Island, South Australia.

He has been doing excellent work with the cultivation of our native plants for many years and, by taking his car over with camping-out equipment, we were able to devote a maximum of time to the flora.

We proposed to go by way of the South coast road to Flinders Chase, then cross to the middle road, but the surfaces were so bad we found it impossible to get through, and so complete a round trip. As soon as the car was hoisted from the boat we left Kingscote settlement, but soon stopped to examine *Thryptomene ericacea* which is peculiar to this Island although similar in flower to the Grampian's plant it has much shorter, narrower foliage.

Not far beyond our first stop we found *Boronia coerulescens* on the side of a hill; while the flowers appeared superior to the form on the mainland, the condition of plants suggested a hard struggle for existence. Following the South coast road, we next encountered flowering plants of slender *Boronia filifolia* which extends right through to the western end of the Island; it is a small rosy-flowered species well worthy of cultivation.

The most outstanding wildflower near our camp at Vivonne Bay was endemic *Correa minor* which made a brilliant show with its vivid red bells. Several other interesting species in this locality were *Grevillea pauciflora* and *Lanopetalum discolor*, the latter a lover of limestone formations.

Approaching Flinders Chase, we found the first plants of *Boronia edwardsii* and these were the most beautiful flowers observed on the whole trip. This elegant species does not occur on the eastern portion of the Island and it would seem to require the higher rainfall of the west; its cultural potentialities are not yet known.

We spent an interesting morning in the Flinders Chase sanctuary noting that the kangas there seemed to favour the highest positions in the trees and all appeared in excellent condition. Here, another endemic flower, *Tetraloaea holmboeana*, had almost leafless stems and beautiful deep pink flowers. Other species worthy of mention were: *Adenanthos sericea*, softly silky-grey in foliage and with pink flowers, *Conospermum patens* with long spikes of pretty blue flowers; *Grevillea rogersii* and *G. quinqueremia*. Both grevilleas are confined to Kangaroo Island, the first being a low growing shrub with rough awl-shaped leaves and bright red flowers, while the second assumes an upright habit and bears pretty pink flowers clustered along the stems.

Golden guinea-flowers are always gaily floriferous, and the two species noted on this trip *Hibbertia procumbens* and *H. virgata* were no exception to the rule, adding bright colour to the landscape. Of the several *Prostanthera* species observed perhaps *P. microphylla* was the most interesting because of the unusual blue-green colour of its flowers.

Not many birds were seen on the way to Flinders Chase sanctuary, but in the reserve itself many kinds were noted in the short time spent there. Kangaroo Island is fortunate to be free of rabbits; wild pigs, however, are proving destructive in some places. Soldier settlement is responsible for the clearing of a big area on the middle road, but fortunately the proposal to excise portion of the Flinders Chase sanctuary has been abandoned.

This lovely island with its most varied flora, including many endemic species, may justly be termed a "botanist's paradise."

NEW SPECIES OF POMADERIS

By N. A. WAKEFIELD

During the past few years, an investigation has been carried out on the species of *Pomaderris*; and a monograph of the genus is being prepared for publication. As this will not appear for some considerable time, the following summary of 15 new species and three new combinations is presented, so that such will be available for inclusion in forthcoming works on sections of the Australian flora.

The species are placed hereunder, in five groups—with (probably) sectional characters, according to the main divisions of the genus, in order to avoid a great amount of repetition in a necessarily brief paper.

GROUP A

Species with the capsule semi-exserted from the more pubescent calyx-tube; cocci opening by a neat basal lid; flowers pedicellate in loose panicles; calyx-tube more or less villosa; ovary inferior, silky-pubescent round the style; bracts deciduous; anthers normally long and narrow.

POMADERIS SIEBERIANA, sp. nov.:

Folii ovato-lanceolatis, ad 8 cms. longis, supra glabris, infra reticulato-venosis in lamina pilas parvos curvatos in costis petiolisque majores fasciculatos fuscis ferentibus; paniculis magnis, corymbosis; calycis tubo albo-villosi; petalis magnis, auriculatis; stylo via diviso.

HOLOTYPE: Princes Highway, Bellbird Hill, East Victoria; 3/10/1947; N. A. Wakefield, No. 2041 (Melb.).

Represented by several collections in Sieber's *Pl. exsicc.* N. Holl. No. 213. The species is abundant in New South Wales and Victoria.

POMADERIS AFFINIS, sp. nov.:

Folii ovatis, ad 7 cms. longis, supra glabris, infra reticulato-venosis, sparse villosis, costis ramulisque fasciculato-villosis; paniculis magnis, corymbosis; calycibus albo-villosis; petalis ovatis; stylo ad medium diviso.

HOLOTYPE: Princes Highway, between Cabbage Tree and Bellbird, Victoria; 19/9/1948; N. A. Wakefield, No. 4398 (Melb.).

Identical in most features with *P. lanigera*, which has upper leaf-surfaces pubescent, and a fine woolly vestiture. Found in New South Wales and Victoria.

POMADERIS PILIFERA, sp. nov.:

Folii late ellipticis, ad 4 cms. longis, marginibus planis, supra glabris, infra reticulato-venosis, cano-tomentosis, costis ramulisque pilas longos ferentibus; paniculis sub-pyramidalis; calycis tubo sparse sericeo-villosi; petalis orbicularibus; stylo ad medium diviso.

HOLOTYPE: Pheasant Creek (Snowy River), Victoria; 18/10/1947; N. A. Wakefield, No. 2089 (Melb.).

Common in New South Wales, Victoria and Tasmania.

POMADERIS AUREA, sp. nov.:

Folii ovatis, circa 3 cms. longis, supra stellato-pubescentibus, infra reticulato-venosis albo-tomentosis et pilosis, costis ramulisque ferrugineo-pilosis; floribus aversis; paniculis pyramidalis; calycibus villosis, petalis orbicularibus; stylo longo, via diviso.

HOLOTYPE: Upper Genoa River, Victoria; 2/10/1949; N. A. Wakefield, No. 4435 (Melb.).

The species is found in New South Wales and Victoria.

POMADERIS SERICEA, sp. nov.:

Folii ovato-lanceolatis, ad 2 cms. longis, supra glabris, infra pinnato-costatis nitidis subferrugineo-pilosis; floribus apetalis, pallidis, paniculis parvis, subglobosis; calycis tubo dense sericeo-villosi; stylo profunde diviso.

→ continue at top of p. 142

December
1851

N. A. WAKEFIELD, New Species of Pomaderris

141

(Gr. with p. 142)

→ from *P. cotoneaster* (at bottom of p. 142)

The type tree is the only known Victorian occurrence of the species which is otherwise known from a few New South Wales collections

POMADERIS COSTATA, sp. nov.:

Foliis supra glabris, infra dense et breviter albo-tomentosis.

HOLOTYPE: Brodribb River, East Victoria; 2/11/1947; N. A. Wakefield No. 2088 (Melb.).

The species grows abundantly in three eastern Victorian localities, and has been collected once in southern New South Wales.

GROUP D

Species with capsule glabrous, quite exserted from the small stellate-tomentose calyx-tube; cocci opening by a large irregular lid; flowers small, pedicellate, apetalous; anthers short, broad; ovary prominent, glabrous; style short, cleft to base; inflorescence thyrsoid, leafy.

POMADERIS HELIANTHEMIFOLIA, (Reiss.) comb. nov.:

Synonym—*Trymalium helianthemifolium* Reissk., *Linnaea* 29, 271 (1857).

Scattered in New South Wales and Victoria.

POMADERIS ANGUSTIFOLIA, sp. nov.:

Foliis oblongo-linearibus, circa 1 cm. longis, marginibus valde recurvatis, supra stellato-hispidis, subtus dense albo-tomentosis; costis ramulisque sparse et fusce fasciculato-pilosis.

HOLOTYPE: Upper Genoa River, Victoria; 17/10/1948; N. A. Wakefield No. 4381 (Melb.).

Plentiful in New South Wales and Victoria. It was designated by Benthum, (l.c.: 419), as "*P. ledifolia*, var. (?) *angustifolia*".

GROUP E

Species of undermentioned or other affinities.

POMADERIS BRUNNEA, sp. nov.:

Foliis ellipticis, circa 3 cms. longis, supra glabris pinnato-sulcatis, infra dense lanatis; floribus apetalis, subsessilibus, subcapitatis, externis villosis, intimis dense ferrugineo-villosis; paniculis longis foliosis, bracteis hirsutis, persistentibus.

HOLOTYPE: Hawkesbury River, New South Wales: on the edge of the salt-water, October 1918; W. F. Blakely (N.S.W., No. 5764).

POMADERIS PAUCIFLORA, sp. nov.:

Foliis oblanceolatis, ad 2 1/2 cms. longis, obtusis, supra breviter hispidulis, infra breviter albo-tomentosis, costis pilis fasciculatos ferentibus; floribus apetalis; paniculis thyrsoides, paucifloribus; calycis tubo breviter hirsuto; stylo ad basem diviso; capsulis supra dense ferrugineo-villosis; coccis dehiscentibus operculo magno.

HOLOTYPE: Upper Genoa River, Victoria, 17/10/1948; N. A. Wakefield (No. 4389) and J. H. Willis (Melb.).

The species is scattered in New South Wales and Victoria.

POMADERIS FELLEA, sp. nov.:

Foliis late ellipticis, circa 4 cms. longis, supra minute retulinis, infra valde pinnato-costatis vellets; floribus magnis, paniculatis, externis densissimis et breviter albo-lanatis, intimis albo-villosis, petalis angustolanceolatis; stylo profunde diviso.

HOLOTYPE: Torrington, New South Wales; October 1911; J. L. Boorman (N.S.W., No. 5434).

Confined to north-east New South Wales and South-east Queensland.

POMADERIS PALLIDA, sp. nov.

Foliis angust-ellipticis, circa 1 cm. longis, marginibus valde recurvatis, supra cineris minute stellato-velutinis, infra canis, costis pilosis; floribus apetalis, pedicellatis, externis ciliatis, intimis albo-pubescentibus; paniculis parvis, foliosis.

→ continue at top of p. 143.

→ from *P. sericea* (on p. 140)**HOLOTYPE:** Upper Genoa River, Victoria; 2/10/1949; N. A. Wakefield, No. 4431 (Melb.).

Plentiful but localized, and otherwise collected once in New South Wales.

POMADERRIS ARGYROPHYLLA, sp. nov.:*Folius lanceolatis, ad 10 cms. longis, supra glabris, infra valde pinnato-costatis laeviter argyro-tomentosis; floribus parvis, apetalis; paniculis magnis, sparsis, calycibus ramulisque breviter pubescentibus, stylo profunde diviso.***HOLOTYPE:** Concoolabin, Blackall Range, Queensland; 15/10/1943; C. T. White, No. 12322 (Bris.).

Distributed from north-east New South Wales to tropical Queensland.

POMADERRIS NITIDULA (Benth.) stat. nov.:Synonym—*P. Phillyreoides*, var. *nitidula* Benth., *Fl. Austr.*, 1, 418 (1863).**LECTOTYPE:** "Mt. Lindsay, W. Hill" (K.).

Found in north-east New South Wales and south-east Queensland.

POMADERRIS TROPICA, sp. nov.:*Folius ovatis, ad 7 cms. longis, supra minute stellato-volutinis, infra valde pinnato-costatis albo-tomentosis; floribus parvis, apetalis, corymboso-paniculatis; calycis tubo dense cano-pubescente; antheris brevis, latis; stylo breviter diviso.***HOLOTYPE:** Walsh's Pyramid, North Queensland; 7/8/1938; H. Flecker (Bris.).**POMADERRIS CANESCENS** (Benth.) stat. nov.:Synonym—*P. ferruginea* var. *canescens* Benth., l.c.: 417.**GROUP B**

Species with capsule densely ferruginous-villose, deeply immersed in the less pubescent calyx-tube, cocci dehiscing by a longitudinal as well as lateral basal slits; flowers sessile in heads with persistent involucre-like bracts; calyx-tube villose; ovary inferior, ferruginous-villose round the style; leaves oval to orbicular, up to 2 cms. long; upper surfaces deeply pinnate-costate.

(Both species hereunder are allied to *P. betulina* which has a scuffy-stellate tomentum on branchlets and under-surfaces of leaves.)**POMADERRIS ERIOCEPHALA**, sp. nov.:*Folius supra hispida, pilis simplicibus, subtus dense lanuginosis; floribus saepius apetalis, sessilibus, dense capitatis; bracteis lanuginosis.***HOLOTYPE:** Upper Genoa River, Victoria; 2/10/1949; N. A. Wakefield, No. 4434 (Melb.).

Abundant in New South Wales and Victoria.

POMADERRIS SUBCAPITATA, sp. nov.:*Folius supra dense et minute vultuino-pubescentibus, infra castis pilos ferrugineos ferentibus; floribus subsessilibus, subcapitatis; petalis angusto-spatulatis.***HOLOTYPE:** "Tomah to Cockatoo," New South Wales; Nov. 1900; W. Forsyth (N.S.W., No. 5750).

Abundant in New South Wales and Victoria.

GROUP C

Species with leaves broad, obtuse, 3 to 5 cms. long, strongly pinnate-ribbed beneath; flowers apetalous, white, in dense pyramidal panicles, calyx-tube villose; style very deeply cleft; capsule greatly exserted. (not seen mature).

POMADERRIS COTONBASTER, sp. nov.:*Folius supra pilos densos breves simplices vel stellatos ferentibus, infra dense stellato-tomentosis.***HOLOTYPE:** Upper Genoa River, Victoria; 5/11/1950; N. A. Wakefield, No. 4423 (Melb.).

→ continue at top of p. 141

→ from *P. pallida* (at bottom of p. 141)

HOLOTYPE: Murrumbidgee and Cotter Junction, New South Wales; 5/11/1911, R. H. Cambage (N.S.W., No. 3651).

Scattered in New South Wales, and recorded once in Victoria.

(I am indebted to Mr. T. S. Hart of Crovdon, Victoria, for assistance with the compilation of these Latin diagnoses.)

ANTS AND ACACIA SEEDS

When on an outing with the Bendigo field naturalists at Diamond Hill, near Bendigo, on March 3, 1951, a number of ants' nests were observed, each with a number of acacia seeds within distances of approximately 5 to 8 inches from their entrances. This observation caused some comment as to the presence of the seeds. The nests were apparently not large, if the small mounds were any indication, and the ants of medium size and black. The nearest acacia plants were a number of Golden Wattles (*A. pycnantha*), from 15 to 20 feet distant. Judging from the size, I believe the seeds near the nest entrances were from these wattles. I formed the opinion that the seeds may have been collected by the foraging ants as food, brought to the nest entrances and then rejected as unsuitable. I will quote several observations to support this theory. Some years ago, when on a week-end hiking expedition in the Whipsirk, our small party walked until dusk had fallen, and made camp for the night without any inspection of the site. On waking in the morning with ants swarming over and about us, we soon realized our camp site obstructed a well defined ant track, from a large mound some 30 feet away. While breakfast was being eaten (off the heather track) these black ants collected crumbs and other morsels dropped during the meal, and carried them back into their nest. One ant picked up a half burnt match and proceeded to carry this back also. Several matches were thrown down, and all were taken by ants, sometimes four or five to a match, some pulling backwards, others forward, but gradually conveying them to the mound. The strength of an ant is remarkable, as at times a single ant, unaided, would catch hold of a match and raise it to the vertical. A match would be brought to within an inch of the entrance, where it was dropped, the carriers disappearing within. Usually within several minutes some ants would appear and drag the match 6 or 8 inches away and apparently abandon it. It would be impossible to say whether the ants which brought the matches were the same ants which took them away.

The second instance was observed while eating some lunch during a bush hike. This lunch was the usual hiker's standby of dry biscuits and cheese, and soon many black ants were carrying crumbs to a nearby nest. The entrance became blocked with pieces of biscuit too large to enter the hole. The blockage was cleared by the ants, breaking off small pieces and carrying them inside. Several ants were observed carrying small pieces of tinfoil varying in size from half to one square inch, the wrapping from around the cheese. All were dropped within several inches of the entrance. Although this nest was under observation for half an hour, no ants reappeared to move the tinfoil, either inside or, as in the case of the matches, further away from the entrance.

WILLIAM PERRY (Eaglehawk, Vic.).

A GRACEFUL NATIVE SHRUB

Those who consider that few of our native shrubs are compact and bushy should see a plant of flax-leaf heath-myrtle (*Baeckia lunifolia*) in the Australian border at the Melbourne Botanical Gardens. The colourful buds and stems, the fine shining foliage, and the very compact nature of this shrub make it a real gem. The flowers are like small tea-tree (*Leptospermum*) flowers. This specimen is situated in the Australian border not a great distance from the Park Street entrance.

-A.E.B.

WHAT, WHERE AND WHEN**Preliminary Announcement:**

Saturday, February 16, 1952—Motor Coach Excursion to Cape Shank, via Dromana, Bonue Road, return through Red Hill. Coach leaves Bauman Avenue 8.15 a.m. Subjects: Geology, Botany and General. Leaders to be announced. Reserved seat bookings, 18/-, with Mr. H. Stewart, 14 Bayview Tce., Ascot Vale (Telephone: FU 1096). Four seats at half fare allotted to junior members.

MARYBOROUGH FIELD NATURALISTS CLUB

Word has just been received of the formation of this Club, whose object has been defined as 'The Study of Nature with an initial approach through native plants and trees.' President is Mr. R. A. Hill and Secretary, Mr. R. D. Kent.

The F.N.C.V. extends a welcome and good wishes to the new Club.

NATIVE PLANTS PRESERVATION GROUP

It is unnecessary to dwell on the need for preservation but if the F.N.C.V. does not give a lead in definite activity it would seem that little will be done.

The Native Plants Preservation Group has made a beginning; the introduction of Group Associates and Local Representatives increases contacts and provides important help but the chief need is more active support from Club Members. Any progress emphasizes the value of subscriptions; when the Group offers £10 towards a project, the moral support gives confidence to local workers.

Moral support is also given to the Group by the subscription and name of any member of the Club who joins. The payment of the minimum subscription, 5/-, shows that your interest is worth that sum and the trouble of paying it. If you are interested in what remains of our flowers you may have friends who would be glad to be Group Associates.

Financial support does not commit anyone to other activities but if there is to be real progress and continuity there must be *constructive thought and widening of responsibility*.

Preservation has several aspects; those interested must have ideas, the pooling of these ideas may lead to progress.

—W.W.

RARE FROGS PROTECTED

The Australian Journal of Science for December, 1950, records the following item:

"The rediscovery of a small colony of the primitive frog *Liolobina hamiltoni* on Stephen's Island in Cook Strait was immediately followed by arrangements for fencing to prevent stock grazing, and an enquiry into the possibility of improving dampness in the area in periods of drought. The frogs are afforded absolute protection under the New Zealand 'Animals Protection and Game Act.'"

In this country interest in our primitive and lowly fauna appears to have waned so much that it might be difficult to determine what species require such urgent measures for their preservation. From past experience we may be sure there are plenty.

J. R. GARRETT

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, December 10, 1951. The President, Mr E. E. Lord, was in the chair and about 180 members and visitors attended.

The President announced the death of Mr. J. M. Black, of South Australia, and members stood in silence in his memory. Mr. J. H. Willis spoke briefly of Mr. Black and his work, commenting on the fact that Mr. Black only commenced the study of botany when aged 54, and at the time of his death at 97 he was still working on the revision of his *Flora of South Australia*. He was the nominee of the Club when awarded the National History Medallion in 1944.

Miss Thelma Crawford, Dr. H. Wettenthal and Mr. W. H. Miller were elected and welcomed as Ordinary Members.

A request was made for short articles for the *Victorian Naturalist*, and that notes on exhibits of special interest be handed to the Secretary.

Miss Waddell requested more support from members for the drive for preservation of our native flowers, and asked for help with ideas as well as money.

Mr. V. Miller drew the attention of the Club to the neglected state of Macdonald Park at Black Rock, and the President promised that the matter would be investigated by Council.

Mr. J. Béchervaise was the lecturer for the evening, and his "chat about a river" became the enthralling story of the Snowy River, and a little known and rugged part of Victoria. His fine colour pictures showed the majesty and wildness of the Snowy River gorges, and finished with a shorter trip along the quieter reaches of one of its tributaries—the Suggin Buggan. Comments were made by Mr. N. Wakefield and Mr. Burston, who knew the district well, and the President conveyed the thanks of the large gathering to the lecturer.

EXHIBITS

FLOWERS AND PLANTS: Kangaroo Paw (*Anigozanthus flavida*), Kapok, Cotton and "Money" berries (from the New Hebrides), Miss J. Ralf. *Rhinacarpus* (with seed), Mr. Brooks. Kangaroo Paw and *Cordyline stricta*, Botanic Gardens.

Bell-fruit tree (*Codanacarpus retinifolius*), rare tree from Hattah, Victorian Mallee, Mr. H. Stewart.

Plants from Buffalo plateau, Mrs. Hobson

CORRECTION

In *New Species of Pomadorris* by N. A. Wakefield, in *Vict. Nat.*, Dec. 1951, pages 141 and 142 have been transposed in printing. "Holotype" on p. 142 of *Pomadorris sericea* should follow immediately after its Latin description on p. 140. P. 141 follows immediately after the end of p. 142.

THE CROWNED OR CORONATED SNAKE

By DAVID FLEAY, Healesville, Vic.

One of the most interesting groups of midgets among Australian snakes is made up of the "little fellows" of the Copperhead genus (*Denisonia*)—a name derived from that of Sir William Denison, Governor of New South Wales from 1855 to 1861.

Commonly referred to as Whip Snakes (as are small *Demansias*), and with good reason because of their rapid lashing movements when disturbed, these handsomely marked small reptiles, varying between 10 and 30 inches in total length, number at least sixteen species. Actually the Copperhead is the only big fellow among all the *Denisonias* and it has a restricted south-eastern distribution, whereas some of the whip snakes like Gould's species are widely scattered across Australia, and it would scarcely be an exaggeration to state that there are representatives in all parts of the Commonwealth.

Early last October (1950), while rambling on a warm spring morning through the Murrumbidgee country in the vicinity of the inflow of the Lachlan River (N.S.W.), we made the acquaintance of what was to us an entirely "new" whip snake. The unearthing of a fat "Tiger" which had vanished beneath a partially embedded log was responsible not only for the successful bagging of this furious fugitive but the discovery of two prettily marked small snakes neatly and comfortably curled in close-fitting "seats" originally between log and ground. Each was thoroughly asleep but on warming up in the sunshine soon shot about at speed with ever-flickering tongues and lashing movements, ending as suddenly as they began.

Adults of this species, of which we eventually found quite two dozen in the river frontage country, and which proved to be the Crowned or Coronated Snake (*Denisonia coronata*), averaged 16 inches in length. They were a glossy olive-brown in general body colour above, with a narrow margin of slate-grey along the ventral shield scales on each side below the body. Otherwise the ventral surface was yellowish-white with scattered dots of slate-grey. All were distinguished by a shiny black patch variable in extent across the nape at the base of the comparatively small head. This patch usually extended forward to a point between the eyes, shading the greater part of both large parietal scales and a section of the frontal. This irregular shiny black head pattern was indeed a crown, adding a distinctive touch to these very handsome little snakes.

Often when discovered beneath logs or fallen red gum bark the semi-cold Coronated Snakes twisted their bodies into rigid convolutions so that they remained in the same attitude even when turned upside down. At such times the body was amazingly depressed with the ventral area widely and perfectly flat and the



David Fleay photo.

Handsome glossy appearance of adult Coronated Snake (*Denisonia coronata*) after skin sloughing. Note distinctive black crown partly shading parietals and frontal scale.

dorsal surface a shallow flat oval in cross section. On these occasions one had the time and opportunity to admire the unbelievably glossy, almost lacquered, appearance of the snake's whole underside. The most remarkable impression we gained of these little snakes was their softness and general delicate make-up. It was only too easy to injure them, and extreme care was essential in handling and placing the small snakes in bags with any heavier-bodied reptiles. The mere weight of several bigger snakes could cause fatalities among the Whip species in a walk back to camp.

Only on two or three occasions in the course of discovery of twenty-four or so Coronated snakes was a specimen seen out basking in sunlight. In nearly every case they were discovered during the course of enthusiastic grubbing and the heaving over of fallen tree shells, bark, and even debris of boxes, bags and tins about old camp sites by members of our party.

They were extraordinarily sluggish during daylight hours and it seemed that these small fellows, obviously an easy mark in a habitat lacking undergrowth for keen-eyed birds, were largely nocturnal. This appeared to be borne out by discussion with Murrumbidgee bushmen, who frequently found them abroad at night and who, remarkably enough, without any knowledge of the relationship of this small snake to the large south-eastern *D. superba*, knew it locally as the Copperhead! In captivity, also, the Coronated Snake usually hides away by day, gliding forth after sundown on warm nights to seek food. It is interesting to note here that Copperheads also move actively on warm nights and that infants of the species seek food during nocturnal excursions.

Tests of the degree of belligerence to which Coronated snakes could be excited showed nothing of a spectacular nature, though naturally they were treated with respect, for sixteen years previously a closely related specimen of *D. coronoides* (White-lipped Whip Snake) I had taken to Dr. C. H. Kellaway proved itself capable of killing an adult guinea pig.

Depressing themselves almost into a flat worm outline, thoroughly warmed up Coronated snakes swing about actively, but this show of ferocity appeared to be pure bluff, for it seemed that these small fellows had little intention of biting and their whole idea was that of a surreptitious and very rapid get-away.

In all the localities where we came across *D. coronata* (not once in neighbouring mallee scrub, but only in river frontage box and red gum areas) there was an abundance of the small spotted or marbled frog (*Lymnodynastes tasmaniensis*). These occurred in scrambling masses at times in all sizes from little to big, under fallen bark at the water's edge, and this amphibian appeared to be the Coronated Snake's main source of food and also that of the associated Black Snake (*Pseudechis porphyriacus*). Doubtless, like other small Denisonias, *D. coronata* takes insects and possibly



David Fleay photo.

Ventral appearance of Coronated Snake (adult) showing slate-grey border to ventral shield scales, scattered slate-grey dots and single subcaudal (under-tail scales) typical of a *Denisonia*.

small lizards such as geckoes. Kinghorn credits the species with a liking for grasshoppers, and states that it gives birth to living young numbering about ten to the annual litter.

He also credits the species with a fully grown length of 25 to 30 inches, and Waite (*Reptiles and Amphibians of South Australia*) mentions 1 ft. 6½ in. However, few of the Murrumbidgee specimens were more than a fraction over 18 inches, though in many cases they were comparatively thick little fellows for the body length.

Distribution of the species is listed as fairly wide in Australia, extending from Western Australia to New South Wales. It would be instructive to learn the types of habitat involved in its occurrence in South Australia and Western Australia.

WHY NOT OBSERVE SNAILS?

What about making a pet of a snail? They seem to be most sensible and discriminating animals, and do not stray. Did you know that snails always roost under the same stone night after night, yes, and under the same spot under it, too!

Cecily Morrison has been studying them recently and has written a fascinating article on them in *Country Life*. (*Homing instinct of the snail*, by Cecily Morrison, *Country Life*, August 17, 1951).

She put coloured spots on the snails and on their roosting place for individual snails aren't always so easy to recognize if you are not another snail and every night for two weeks she found that they came back—all except four out of nine which ultimately failed to return, and maybe they met a hungry thrush or an irate gardener.

Snails can apparently find their way by instinct without adequate eyes. It is recorded that the naturalist Edward Step marked the shell of a snail that was eating his arum lily, then threw the snail over the garden wall and across a roadway. Next day the marked snail was back on the arum lily. A snail can distinguish between cabbage and lettuce by smell, and can steer a straight course across a 3 ft. wide gravel path, over a 4 ft. wall straight to the lettuce bed from which it habitually feeds, returning at night to its roost in its usual spot under the stone.

The author of this article teased her marked snail by moving the lettuce around, finally hiding it behind a stone. The snail followed all the movements of the lettuce, even rearing itself up when the lettuce was held above it. It was clear that the snail employed smell rather than sight in its search, for not only are its eyes rather rudimentary, but by the time the experiments were finished it was so dark that the author had to use a torch to find her way home, yet the snail chased unerringly around after the lettuce.

These were English snails and English lettuces. Is any Australian gardener willing to spare the life of a snail or two and sacrifice a young lettuce in the cause of science? Here is a chance for someone to start a little biological research and provide the *Naturalist* with another article. What about it, Juniors? There must be plenty of snails around some of your gardens.

—ASST. ED.

THE GENERA OF VICTORIAN MOSSES, AND NEW RECORDS OF SPECIES FOR THE STATE

By H. T. CLIFFORD and J. H. WILLIS

(Continued from last issue)

35 SPECIES OF *MUSCI* NOT PREVIOUSLY RECORDED FOR VICTORIA

(Annotated list alphabetically arranged, the † sign denoting a new generic record. Collections made by the writers are located in their respective private herbaria.)

ANDREÆA SUBULATA Harv.: Bogong High Plains—basaltic rocks on Basalt Hill at head of Rocky Valley ca. 5,500ft. (J. H. Willis, Jan. 1947; H. T. Clifford, Jan. 1948); Mt. Buffalo (*leg.* Jan. 1910, in Breidahl Herb., Metb. Univ.); Raw Baws—granite boulders near running water at Ski Club Hut ca. 4,700ft. J. H. Willis, Mar. 1951); Calceatista Falls, Grampians (F. Robbins, Aug. 1944).

Resembling tufts of short black hair on mountain rocks, this little moss is not uncommon in Tasmania, but was known on the mainland by apparently only one collection, viz. Wentworth Falls, Blue Mts. at 3,000ft. (Prof. A. Burges, Aug. 1930).

†**ARCHIDIUM STOLONACEUM** C.M.: Castlemaine gull links (F. Robbins, Mar. 1944).

When first examining this collection, Mr. G. O. K. Sainsbury thought it referable to the diminutive *Bruchia Whiteleggi* C.M., but he later made the above determination. *A. stolonaceum* was previously known from the Port Jackson area.

†**BRYOBARTRAMIA ROBBINSII** Sainsbury: Castlemaine—on the ground in grassland or grassy forest (F. Robbins, 1942—TYPE); Logan, 12 miles E. of St. Arnaud—on exposed ground (R. D. Lee, Sept. and Nov. 1951).

A special family, *Bryobartramiaceae* was established to accommodate this unique and extraordinary plant less than 3 mm. high) which Sainsbury amply described in *The Bryologist*, Vol. 51, Mar. 1948. The epigonium completely encloses both seta and capsule until the spores are fully ripe and ready for dispersal—a feature not known among any other mosses. The specific epithet fittingly honours the discoverer, Mr. Frank Robbins, who has made many interesting contributions to the botany of Victoria. For nine years the most careful searching failed to reveal any further material (even in the type area); then, a few weeks ago, Mr. R. D. Lee was successful in finding good specimens of *Bryobartramia* twice, while gathering other mosses for identification at Logan on the Avoca River—55 miles N.W. of the original collecting place. Adequate collections, in all stages of fruiting, are still a necessity for studying the developmental details and affinities of this tiny ephemeral species.

BRYUM BLANDUM Hook. & Wils.:

It is singular that no previous record (and very few collections) had been made by moss enthusiasts in Victoria, for *B. blandum* is well known in Tasmania and New South Wales, while we have noted it as conspicuous at a number of subalpine locations, e.g. Taggerty, Delatite, Dandongdale, Jamieson, Cobungra and Big Rivers, Victoria—always forming deep, rounded, lustrous, dark green or reddish cushions on rocks in running water, frequently submerged and rarely to be seen in fruit. Mason's Falls, Kinglake National Park (J. H. Willis, Mar. 1951), is apparently the nearest locality to Melbourne.

CAMPYLOPUS KIRKII Mitt. ex Beckett: Oakleigh (Dr. A. Morrison, Aug., 1895—Herb. Edinb. No. 94).

The species was recorded for the first time on the Australian mainland by H. N. Dixon in *Notes from the Royal Botanic Garden, Edinburgh* 20: 94, Mar. 1948. One of us (J. H. W.) obtained a fragment of the Oakleigh collection from Edinburgh and Mr. G. O. K. Sainsbury, who examined this, confirms Dixon's identification. *C. Kirkii* must surely occur in other parts of Victoria; it is a blunt-leaved species like *C. bicolor*, but has basal auricles and a much narrower nerve than in *bicolor*.

†*CRATONEUROPSIS DECUSSATA* (Hook.f. & Wils.) Fleisch.: Mt. Disappointment (N. Taylor, ca. 1868); Omeo at 2,200 ft. (J. Stirling, ca. 1885); Mt. Painter high plains, ca. 5,500 ft. (A. J. Tadgell, Feb. 1926); Lower Glenelg River—springs on limestone cliffs at Eaglehawk Bend (J. H. Willis, Oct. 1948); South Portland—growing with *Drepanocladus aduncus* (Cliff. Beaglehole, No. 1307 in part, Aug. 1948); also Moleside Ck., Spring Ck., etc. (C.B., Nos. 1388, '89, '90 and '91).

Although collected so long ago and determined by Hampe in 1870, Victorian occurrences have never been placed on record. The moss is riparian with long branches of yellowish, squarrose and regularly recurved leaves. Glenelg River specimens are often heavily encrusted with lime and have a curiously coralloid appearance, as do examples of *Distichophyllum* from the same calcareous chills.

CRYPHÆA EXANNULATA Dixon & Sainsbury: Lakes Entrance—on bark in jungle gullies (R. A. Bastow, Nov. 1901).

Not previously recorded for Australia, it is a slender plant differing from other Victorian species in the narrow, acuminate and more spreading leaves. New South Wales *C. tenuella* (Schwgr.) Hornsch. is very similar and hardly to be distinguished vegetatively, but it has capsules with well-developed annulus and much longer peristome.

†*DALTONIA SPLACHNOIDES* (Sm.) Hook. & Tayl.: Sherbrooke Falls, Dandenong Ranges—on dead twigs of *Hedyocarya* in a deep moist fern gully (J. H. Willis, Nov. 1946).

Apparently the first record of this genus for the Australian mainland, one species (*D. pusilla* Hk.f. & W.) being known from Tasmania. We have compared the rare Sherbrooke plant with certified material of *D. splachnoides* from Killarney region, Ireland, and find it a very good match. Opportunity has not come to examine specimens of Tasmanian *D. pusilla*, but we strongly suspect that it will prove to be inseparable specifically from the widespread *D. splachnoides*—a very beautiful little moss, with shining lanceolate foliage and nutrifoliate calyptra with cilia.

DREPANOCLADUS ADUNCUS (Hedw.) Warnst.: Darlot's Creek and Fitzroy River near Tyrendarra—on wet rocks (Cliff. Beaglehole, No. 888, Aug. 1948), also at Gorae West (No. 1308), South Portland (No. 1307) and Lower Bridgewater (C. Beaglehole, Aug. 1948).

An aquatic moss with the same long slender branches and general aspect of the closely related *D. fluitans* (Hedw.) Warnst. from which it differs in the completely entire broader leaves with shorter cells. *D. fluitans* had been recorded only once from Victoria (see *Vict. Nat.* 41: 70, Aug. 1924)—by A. J. Tadgell who had it identified from near the summit of Mt. Bogong; but the only specimen labelled as such in his herbarium is unquestionably referable to *Blindia tenuifolia* (Hk.f. & W.) Mitt. However, one of us (H.T.C.) has since collected *D. fluitans* at Basalt Hill on the Bogong Plains (Jan. 1948) and Mr. Sainsbury kindly confirmed the determination.

ECCREMIDIUM ARCUATUM (Hk. & Wils.) Wils. Genoa River Gorge, 3 miles above settlement—on wet granite soil at water's edge (J. H. Willis, Oct. 1948); Kelvin View, 7 miles S.E. of Euroa shallow soil over wet granite slabs (J. H. Willis, July 1951).

A remarkable pygmy moss, not known previously beyond South-west Australia. Like *Pleuridium nervosum* (Hk.) Par., it often occurs in a barren julaceous form growing with that species; but when not in fruit (with arcuate seta) may be recognized by the curiously eroded, serratifirm tips of its very blunt leaves. The Kelvin View material exhibited excellent capsules. The only other record of the genus *Eccremidium* for Victoria (see *Vict. Nat.* 21: 141, Feb. 1905) was almost certainly a mis-identification of *Pleuridium nervosum*, collected by Rev. W. W. Watts at Heyington where this moss is still quite abundant.

TERIOPUS APICULATUS (Hk. & W.) Mitt.: Little Moleside Creek, Lower Glenelg National Forest—growing with *Pterygophyllum* on wet earth under tree ferns (Cliff. Beauglehole, No. 1255, July 1949 and June 1950).

The first Victorian record provides a notable extension in the range of a moss that is of rare occurrence in Tasmania, New South Wales, New Zealand (the type region) and antarctic South America. The genus is characterized by its broad, strongly bordered shining leaves with very bold arcolation and short nerve.

PABRONIA HAMPEANA Sond. ex Hampe: Upper Genoa River (W. Weatherhead, about 1880); Mt. Dandenong—on shady side of large dacite boulders at western foot of mount (J. H. Willis, Dec. 1947); Tyrendarra near Portland—on basalt barriers (Cliff. Beauglehole, No. 1311, Sept. 1951).

P. australis Hook. [syn. *P. Tayloriana* Hampe] was the only species hitherto recorded for the State and this lacks the long slender teeth which characteristically fringe the very slender leaves of *P. hampeana*. Strangely enough, in Western Australia (its type region) and in New South Wales the latter species appears to grow only upon the trunks of cycads (*Macrozamia* spp.).

F. LEPTURA (Tayl.) Broth.: McVean's Springs, Stony Rises west of Lake Corangamite—on basalt rocks (Miss Coryl Skewes, Feb. 1951); Tyrendarra near Portland—on basalt barriers (Cliff. Beauglehole, incidental to No. 1312, Sept. 1951).

Unfortunately this intriguing moss which is known to occur in Western Australia, South Australia, Victoria and New Zealand (all very isolated localities) has never been found in fruit and its true generic position is still debatable. Type came from the Swan River area, W.A. (1843) and Taylor described it as forming: "flattish, shining, silvery green cushions a foot or more wide." It is most likely that the plant will eventually find a resting place in the genus *Ischyradon* with the South African *I. seriatus* (C.M.) C.M. which is vegetatively almost identical—unless that genus be not separable from *Juratzkhaa*, as Fleischer averred.

FISSIDENS HUNTERI J. H. Willis: Goonmirk Creek, a head-branch of Delegate River—on muddy stream-bank (W. Hunter, Apr. 1943—TYPE).

See *Vict. Nat.* 68: 83, Sept. 1951, for information concerning this delicate subalpine species which is at present known only from the single Victorian type collection.

F. LEPTOCLADUS C.M. ex Rodway: Shores of Lake Bullen-Merri near Camperdown—on rich basaltic loam (Miss Coryl Skewes,

Feb. 1951); Merri Creek, Northcote—basalt cliffs (J. H. Willis, Oct. 1951); Studley Park, Kew—base of Yarra cliffs (J.H.W., Oct. 1951); Heyington—damp shaded Yarra cliffs (J.H.W. Sept. 1951); Dutton Springs, 10 miles S.E. of Sale—heavy swamp soils (J. J. Jenkins, Sept. 1951); Toorloo Arm, Lake Tyers (Miss Ruth Clark, Nov. 1951); Bat's Ridges near Portland—on limestone (Cliff Beaglehole, Nos. 1290 and 1292—1948).

Probably much more widespread in Victoria than indicated above, but overlooked like other small species of the difficult genus *Fissidens*. Here the leaf areolation is small and rather indistinct, and a more or less well-defined border (larger on the sheath) occurs along all margins of the leaves which are falcate-secund when dried.

F. PALLIDUS Hk.f. & W.:

It is difficult to understand how this distinctive and widespread plant should have escaped detection in Victoria for so long. We have seen it in the Otways (Beech Forest, etc.), Dandenongs, Kinglake hills, upper Tanjil country and Howe Ranges—always in fern gullies and often associated with *Mittenia plumula* (q.v.) *F. pallidus* is easy to recognize from its very pale, usually fan-like fronds of close-set leaves with large translucent cells and no border whatever.

F. STRICTUS Hk.f. & W.: Mason's Falls, Kinglake National Park—half submerged on rock ledges under the falling water (J. H. Willis, Mar. 1951).

The discovery of such a rare moss is of more than passing interest, for this first collection on the Australian mainland also represents, apparently, the only other record since that of the type—found under similar habitat conditions in southern Tasmania a century before. *F. strictus* closely resembles a miniature *F. rigidulus*, but lacks the leaf border of that large water species.

GRIMMIA TRICHOPHYLLA Grv.: Upper Cobunga River at Dibbin's Hut, ca. 4,400ft.—forming cushions at the water's edge (J. H. Willis, Feb. 1949).

It was only to be expected that this cosmopolitan moss, recorded for all the East Australian States except Victoria, would eventually be found here. It differs from the very common *G. pulvinata* and *G. lavigata* in the yellowish-green colour, narrow tapering leaves and long linear basal cells. The New South Wales occurrence is also alpine (viz. Mt. Kosciuszko).

†*MITTENIA PLUMULA* (Mil.) Lindb.:

Mentioned in this journal (66: 117, Oct. 1949) as a new record for Victoria by Mr. Cliff Beaglehole who collected it at Gorae West near Portland (1948), *Mittenia* had really been first collected here (and correctly determined) by Miss Sybil Church at both Lorne and Kallista in 1938—specimens in Botany School, Melbourne University. We too have collected it in the Dandenongs, at Wallaby Creek (M.M.B.W. reserve), Tanjil Bren and in the Howe Ranges beyond Mallacoota. Probably the species occurs throughout our fern-gully country and is certainly common also in Tasmania, New South Wales and New Zealand. Possibly its resemblance, when withered, to a ragged spindly *Fissidens* accounts for the failure of older Victorian bryologists to collect the plant, but the very long whip-like peristome teeth will immediately distinguish fruiting specimens. *Mittenia plumula* is a remarkable monotype and, except for the doubtfully distinct N.S.W. *M. rotundifolia* C.M., is the sole representative of the family *Mitteniaceae*.

†*MNIUM LONGIROSTRUM* Brid.: Upper Cobungra River at Dibbin's Hut, ca. 4,400ft.—at the water's edge, in shade of tall *Leptospermum* (J. H. Willis & H. T. Clifford, Feb. 1949); Upper Jamieson River, at junction of north and south branches near Mt. Sikene—among wet stones at water's edge (J. H. Willis, Feb. 1949).

With about 80 recognized species, *Mnium* is almost exclusively a boreal genus. However, *M. longirostrum* (syn. *M. rostratum* Schrad.) has a cosmopolitan distribution and is occasionally found in the Australian region. New South Wales records were the only undoubted ones for the Commonwealth until our own Victorian collections were made in 1949. This uncommon plant seems restricted to subalpine stream banks in the eastern part of the State, but is easily recognized from its creeping habit and tall erect shoots with large pellucid leaves which crinkle up in drying; capsules have not yet been observed here, and there was not a single specimen of *M. longirostrum* in the Melbourne Herbarium.

ORTHODONTIUM INFLATUM (Mitt.) Par.: Stanley Creek, Howe Ranges beyond Mallacoota—rotting logs on the shaded jungle floor (J. H. Willis, Oct. 1948).

Wim Meijer (a Dutch specialist in this puzzling genus) has identified the collection cited above as *O. inflatum*, type of which is presumed to have come from the Blue Mountains, but Mr. Sainsbury is rather sceptical about the supposed differences between this species and the common very variable *O. sulcatum* Hk.f. & W. Certainly the Howe Ranges plant looks very distinct from any Victorian material we have seen of the latter; it has a far smaller (less than 1mm. long) capsule of pyriform shape and appears like a mat of soft, pale green hair on woody debris.

†*PSEUDOLESKEA IMBRICATA* (Hk.f. & W.) Broth.: Strathbogie Road, about 5 miles S.E. of Euroa—on wet earth in the shade of rocks along a cascade (J. H. Willis, July 1951).

Distinctively riparian, with brownish rat-tail like branches, this solitary Australian representative of the family Leskeaceae was hitherto known only from southern Tasmania and Cambewarra district, N.S.W. Mr. Sainsbury says that he has never seen good fertile specimens in New Zealand; but in October 1948 one of us (J.H.W.) was fortunate enough to collect fruiting material from the banks of the Murrumbidgee River, 5 miles N.W. of Cooma, N.S.W. Probably the plant is much more widespread along the streams of eastern Victoria and has been overlooked because of its resemblance when dry to *Triglorella*, *Hedwigia* and other commoner mosses.

PSILOPILUM AUSTRALE (Hk.f. & W.) Jæg.: Mt. Bogong, at 6,000ft. and rare (A. J. Tadgell, Feb. 1923).

Apparently the collection cited above was the first and only one of the genus made in Victoria until quite recent years, but Tadgell (in *Vict. Nat* 41: 70, Aug. 1924) recorded it under the name "*P. pyriforme*"—a Blue Mountains plant which we consider is referable to *P. crispulum* (Hk.f. & W.) Jæg. *P. australe* is apparently confined to the highest alps of the State and is rare, for in spite of careful searching we have not located it again in the Bogong region; it seems commoner on Mt. Kosciuszko, N.S.W.

P. CRISPULUM (Hk.f. & W.) Jæg.: Bogong High Plains, along head of Middle Creek at Scout Hut, ca. 5,400ft., and in many other places (J. H. Willis, Jan. 1946; H. T. Clifford, Jan. 1948); Baw Baw plateau, ca. 4,700ft. (J. H. Willis, Mar. 1951).

A much commoner plant in the eastern alps of Victoria than the preceding, from which it differs in the following features: leaves ligulate and of the same width throughout, usually crisping along the margins when dry; leaf lamellæ numerous (to 70) and loosely arranged; peristome teeth 32—*P. australe* has broad leaves, much contracted and indurated above, the lamellæ (about 40 or less) densely packed, and the peristome of only 16 teeth. *P. crispulum* favours damp soil, shaded by overhanging stream banks, and bears conspicuous large, gibbous, green capsules with a short beak.

PTYCHOMITRIUM MITTENII Jæg.: Upper Genoa River (Wm. Weatherhead, about 1880); Boggy Creek, Nowa Nowa (Miss Ruth Clark, Sept. 1951).

The first records for the Australian mainland. *P. Mittenii* Jæg. (syn. *Glyphomitrium serratum* Mitt., non *P. serratum* Schimp.) is a larger, coarser moss than its more frequent congener *P. australe* (Hpe.) Jæg., but apparently it occupies a similar habitat—on wet rocks. Both species have strongly curled-up linear leaves in the dry state, but *P. Mittenii* is at once to be distinguished when moist by the bold multicellular serrations toward the leaf tips.

RHACOMITRIUM AMÆNUM (Broth.) Pat.: Rogong High Plains, along head of Middle Creek at Scout Hut, ca. 5,400ft. (J. H. Willis, Jan. 1946).

Until now, the species seems to have been known only by the type collection (viz. Merritt's Camp, Mt. Kosciusko, Jæg. Maiden & Forsyth, Jan. 1899), a duplicate of which is in the Melbourne Herbarium. It has affinities with the very common rock-loving *R. crispulum* (Hk.f. & W.), but is a more densely tufted plant, having slender branches, smaller leaves and very much smaller capsules.

R. PTYCHOPHYLLUM Mitt.: Basalt Hill at head of Rocky Valley, Rogong High Plains, ca. 5,500ft. (J. H. Willis, Jan. 1947).

A very interesting record, the moss being previously known only from several New Zealand and a single South American collection—all associated with alpine rocks. The marked plication of the large yellowish leaves is its chief distinguishing feature.

RYNCHOSTEGIELLA MURICULATA (Hk.f. & W.) Broth. Melbourne Botanic Gardens—on damp soil in fern gully (J. H. Willis, May 1941; P. Bibby, July 1951); Heyington—wet shaded earth of a drain down Yarra cliffs (J. H. Willis, Sept. 1951); Upper Genoa River (Wm. Weatherhead, about 1880).

A dull green or yellowish closely interwoven moss that spreads rapidly, forming extensive patches. Under oak trees in the Melbourne Botanic Gardens and on lawns, both in the Domain and in other suburbs, it has increased at the expense of grass, becoming a nuisance. The related *Eurhynchium prolongum* (Hedw.) Holb. is a well-known pest in European and American lawns, but this species has dimorphic foliage and longer branches. Probably *R. muriculata* will be found a common plant in shady places throughout Southern Victoria, as it is in Tasmania and New Zealand.

SEMATOPHYLLUM SUBCYLINDRICUM (Broth.) Sainsbury: Echo Flat, Lake Mountain—fallen trunks in shady places at 4,700ft. (J. H. Willis, Jan. 1948).

This is the plant which one of us (J.H.W.) recorded as "*S. tenuirostre* (Hk.) Dixon," in *Vict. Nat.* 66: 159, Dec. 1949; but Mr. Sainsbury has pointed out that *tenuirostre* is a much more robust rupestral species with smaller spores. *S. subcylindricum* occurs in the Volcanic Plateau and East Cape districts of New Zealand, as well as in Java (the type area), and this is the first record

available for Australia. It will surely be found eventually in other places between Victoria and Indonesia.

SPHAGNUM FALCATULUM Besch.: Nayook West—in swampy ground along the Upper Latrobe River (J. H. Willis, Dec. 1929); S.E. slopes of Mt. Clay near Portland (Cliff. Beauglehole, No. 1301, Feb. 1950).

A very distinctive bog-moss and the only Victorian representative of the *Cuspidata* group, it is characterised by long-tapering (almost flagelliform), often falcate lateral branches with narrow, finely acuminate and conspicuously undulate leaves which retain their green colour in drying. *S. antarcticum* Mitt. and *S. subsecundum* Nees grew in the same Latrobe River swamps—a rich hunting ground for Victorian sphagna. We are indebted to Dr. A. Le Roy Andrews (Ithaca, N.Y.) for the accurate identification of this plant with a common South American and New Zealand species.

†**THAMNIUM PUMILUM** (Hedl & W.) Par.: Lower Glenelg River—fern gullies of Little Molecula Ck. (Cliff. Beauglehole, No. 1323 in part, June 1950); Sherbrooke Falls, Dandenong Ranges—barren and long-creeping over very shaded wet boulders amongst ferns (J. H. Willis, May 1951); Plenty River, near head in M. & M.F.W. Reserve—fruiting, under *Nothofagus* in fern gully (David Ashton, Oct. 1951).

This exceedingly slender, irregularly branched moss creeps in cool fern gullies and reminds one of a minute-leaved straggling *Rhizogonium*. The delicate and rather distant complanate leaves are less than 1 mm. long, prominently toothed above, with a nerve (often forked) vanishing well below the apex—characters that at once serve to distinguish it from the other more robust species of *Thamnium*. It usually occurs tangled among various other bryophytes and has doubtless been overlooked. Our present recordings probably constitute the first undoubted ones for the Australian mainland, since many N.S.W. collections so determined are all referable to *T. esfogellare* Aongstr.—a much larger plant in all its parts, with powerful nerves reaching almost to the leaf apices.

†**TREMATODON SP.**: Bogong High Plains, one mile S.E. of Mt. Jim—damp earth between basalt rocks at 5,700 ft. (J. H. Willis, Feb. 1949).

In January 1899, W. Forsyth collected a very diminutive *Trematodon* growing amongst the stems of *Psilopilum australe*, on wet sandy soil high up on the Kosciuszko plateau. Brotherus who examined this material in 1911, pronounced it as representing a new species and wrote the name "*T. pygmaeus*"; but he never went so far as to describe the plant—there were only very immature capsules, still bearing calyptras, and a few old weathered fruits of the previous season. Our Bogong collection, of half a century later, has almost mature capsules with their opercula still firmly attached, and a recent comparison with the Kosciuszko collection (in Sydney Herbarium) convinced us that only one species is involved—apparently in the gymnostomous group of this difficult genus. Until adequate material becomes available for study, it would be inadvisable to publish a diagnosis, and so this high alpine moss must continue to be known under its manuscript name.

TREMATODON SP.: Baw Baw plateau at Ski Club Hut—in wet sand along mountain stream, ca. 4,700 ft. (J. H. Willis, Mar. 1951).

Not uncommon, forming extensive low tufts, with abundant long slender capsules (2-3 mm.). Unfortunately the fruits in this only collection are old, with but remnants of a distinct peristome, and, until satisfactory fruiting specimens are forthcoming, its affinities cannot be established. The species will certainly be a new record for the Victorian moss flora.

†*TRIDONTIUM TASMANICUM* Hook.f.: "Gippsland" (Rev. W. Bennett, before 1923); Little Moleside Creek, Lower Glenelg National Forest (Cliff. Beauglehole, No. 1256, July 1949).

In the third part of his *Studies in the Bryology of New Zealand* (1923), p. 122, Dixon assigns a sterile collection that he had lately received from Gippsland (without precise locality) to this robust riparian species, so frequent in New Zealand and Tasmania. As the record is not likely to have been noted by Victorian bryologists, we repeat it here and add another from the far south-west of the State—supplied by Cliff. Beauglehole, whose specimens (also barren) Mr. G. O. K. Sainsbury has kindly checked for us. Apart from a single collection made at Yarrangobilly, N.S.W., by the late Rev. W. W. Watts, these Victorian occurrences are the only ones known on the Australian mainland.

TORTELLA GIRRHATA (Hampe) Broth: Drik Drik, Lower Glenelg River—in a limestone rock ravine (Cliff. Beauglehole, No. 1337, Sept. 1951).

Superficially very like the New Zealand *T. knightii* (especially in foliage), but distinguishable when in fruit by its shorter, *straight* peristome teeth (they are very long and form a loose spiral in *knightii*). The ligulate, slender, somewhat wavy-margined leaves have a bold excurrent nerve and are extremely curled and shiny in the dried condition; they show the typical V-shaped area of large, lax, hyaline cells occupying the whole leaf-base and sharply delimited from the normal obscure quadrates that fill the remainder of the lamina.

This noteworthy addition to our moss flora is a calciphilous species, previously known only from dune limestones around Perth (the type area), on the islands of the Recherche Archipelago, W.A., and—strangely enough—far away on Lord Howe Island. It will surely appear in many other intermediate stations, particularly on the vast calcareous formations of Eyre Peninsula and other parts of South Australia.

CORRECTION: For "*Physcomitrella* B. & Scap." (in list of genera, *Vict. Nat.* Dec. 1951, p. 137), read *Physcomitridium* Roth.

REGENERATION OF CAPE WATTLES

There is an area near my home which until recently was a market garden. Although this ground had been cultivated continuously over a period of some thirty or forty years, regeneration of native species such as coast wattle (*Acarica sophorae*), tea-tree (*Leptospermum laevigatum*), and cape wattle (*Albizzia distachya*) soon commenced.

First in the regeneration race were several cape wattles whose appearance was something of a mystery, since there appeared to be no parent plant anywhere near the area. Since being introduced from Western Australia the cape wattle has shown a distinct liking for its new environment. Many plants along the Sandringham railway line, and in numerous private gardens in the Sandringham-Brighton area, support the belief that it is one of the most easily grown of native plants.

Although closely related to the wattles, and having the same sleep habit, the *Albizzia* is not a true wattle.

—A.E.B.

MYSTERY EXCURSION—CHELTENHAM TO BLACK ROCK. 21/10/51

The first area to be visited was Cheltenham Park, where about twenty-five acres of land is to be made into an Australian park, similar to Maranga Gardens. Much of the area is covered with coastal tea tree (*Leptospermum lauragatum*) which forms "closed communities", but where clearings occur many native plants and shrubs soon regenerate themselves. The total area of the Cheltenham Park is about fifty-seven acres, but except for the twenty-five acres mentioned, the area has been leased to the Cheltenham Golf Club on a ninety-nine years' lease. The Park, which is crown land, is controlled by the Moorabbin Council as trustees.

A golden wreath wattle (*Acacia saligna*) in full bloom presented a grand sight with its masses of large, rich golden flowers. This Western Australian species regenerates itself readily around this district and fine clumps are to be seen near Hampton station and in Cheltenham Road, Black Rock.

Orchids still to be found in Cheltenham Park include the Fringed Spider Orchid (*Caladenia dilatata*); Mosquito Orchids (*Acinanthus exsertus*), Helmet Orchids (*Corybas dicranicus*), and very large numbers of Trim Greenhoods (*Pterostylis concinna*) in colonies of up to 100 or 150 plants.

After inspecting a flowering Willow Myrtle (*Myrtus laurina*) near the clubhouse and other native shrubs the Victoria Golf Links were traversed. An excellent view of Port Phillip Bay with Arthur's Seat in the background was obtained from one elevated point. Among the many interesting botanical specimens were Spotted Gums (*Eucalyptus maculata*), which have a double cap and derive their name from the way patches of bark lift off from the trunk, leaving "spots" of lighter colour underneath. An interesting comparison was provided by two different species of Manuka Tea Tree. One was native to the area and was covered with a beautiful display of flush pink blooms (*Leptospermum scoparium*), while the other was a garden hybrid with huge pink blooms developed from New Zealand species (*L. scoparium keatleyi*).

A halt was made at the leader's home for afternoon tea and to inspect the garden, where about ninety native species have been planted, including the rare Rosy Bush Pea (*Phyllaea sub-ulmaria*), which is found growing only on the summits of Mt. Rosea and Mt. William, in the Grampians. Samples of orchids shown to the party included Purple Diuris (*Diuris punctata*), Wallflower Diuris (*D. longifolia*), Dotted Sun Orchid (*Thelymitra iscioides*), Waxlip Orchid (*Glossodia major*), Musky Caladenia (*Caladenia angustata*), Brown-beard Orchid (*Calochilus robertsonii*), Pink Fingers (*Caladenia cornea*), Nodding Greenhood (*Pterostylis nutans*), Mountain Greenhood (*P. alpina*), and Red-beak Orchid (*Lyperanthus nigricans*). At the back of the house Mahogany Gums (*E. botryoides*) have been planted, but beyond the front lawn is a row of dwarf Sugar Gums (*E. cladocalyx nana*). This variety, developed in recent years, grows about twelve feet high, and while having the shiny foliage of the usual variety it grows very bushy and forms an excellent breakwind.

The final phase of the excursion consisted of a walk across the Sandringham Golf Links, where Small Grass Trees (*Xanthorrhoea minor*), Fringed Spider Orchids (*Caladenia dilatata*) in number, Gorse Hakea (*Hakea ulicina*), and large numbers of Trigger Plants (*Stylidium grammifolium*), Milkmaids (*Burchardia umbellata*), Curling Everlastings (*Helicoverum scorpioides*), and Fringe Lilies (*Thysanotus tuberosus*) were seen.

The native flora seen is typical of the red sand area which is considered to have extended from Mordialloc to parts of Kew and Camberwell with its eastern boundaries passing through Springvale and Clayton and its western boundary Port Phillip Bay, and including large areas of Malvern, Brighton, Peahran, and even Emerald Hill, now known as South Melbourne.

The colouring matter has been bleached out of the upper layers of the red beds by acids from decaying vegetation, but in the lower layers or in the bayside cliffs the reddish colour may be seen. The red beds consist of

sedimentary deposits carried down from more elevated areas further inland. The red sand area is not regarded as a true "heath" because of the absence of a thick layer of raw humus.

Dr. Sutton's census of the "Sandringham" flora showed a total of 460 species, and included a far larger percentage of plants also occurring outside Australia (31%), and occurring also in New Zealand (26%) than for Australia as a whole. At the time of the census 75% of the orchids known for the State had been recorded in the Sandringham area.

A walk along an avenue of Brush Box trees (*Tristania conferta*) completed the mystery excursion at the Black Rock tramline.

—A. E. BROOKS.

WHAT WOOD IS THIS?

Part 3

By M. M. CHATTAWAY

(Reprinted from the C.S.I.R.O. Forest Products News Letter, No. 185)

RAYS. Wood rays are strips of tissue extending from the outer layers of the tree towards the pith. They serve the dual purpose of conducting manufactured food materials from the periphery of the stem inwards and also of food storage. They are alive throughout the sapwood. On the cross surfaces they often appear as straight lines differing in shade from the background; they may change direction slightly in their course through the wood and may vary considerably in width in different timbers, and sometimes even in different samples of the same timber. On a radial (quartersawn) surface of the wood they appear as ribbons of horizontally running tissue which may differ considerably in colour from the rest of the wood. Large rays are visible as "flecks" on the tangential (backsawn) surface—as in sheoaks and silky oaks. Small rays may in some cases be visible on the tangential surface as faint horizontal lines, owing to their regular arrangement in tiers (Figure 9).

Ray width is estimated by comparison with the tangential width of the pores. This has been found to give much more useful results than any attempt to assess absolute width.

Broad and conspicuous on the cross surface—as in sheoak or silky oak (Figure 7 of last article).

As wide as or wider than the pores. (Figure 7 of last article.) (e.g. sassafras.)

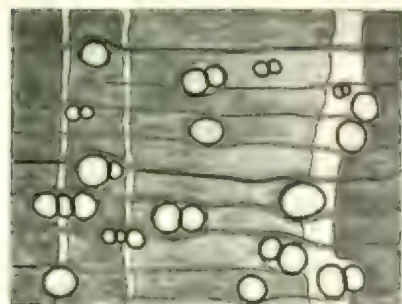
Narrower than the pores (all figures except 7 of last article, i.e. the great majority of timbers).

Not clearly visible, even with a lens. This may be due either to the very small size of the rays, or to the lack of any colour contrast (e.g. brush box and some eucalypts).

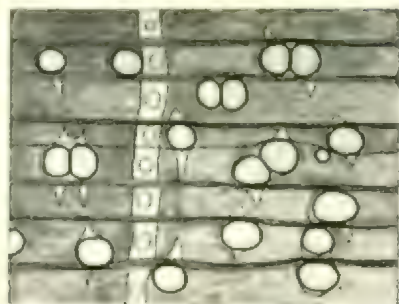
Conspicuous on radial surface owing to colour. This is purely a colour contrast and applies to small rays as well as to large (e.g. kauri and Queensland maple).

DESCRIPTION OF PLATE

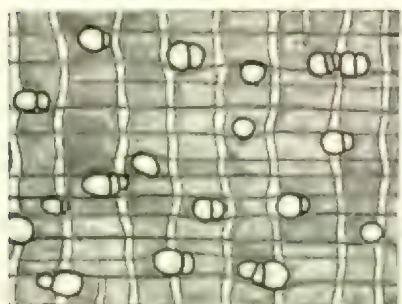
- Fig. 9. Ripple marks due to tiered arrangement of the rays.
 10. Soft tissue in regularly spaced bands wider than the pores.
 11. Soft tissue in regularly spaced bands narrower than the pores.
 12. Soft tissue in irregularly spaced bands, and also surrounding the pores.
 13. Soft tissue wing-like and confluent.
 14. Soft tissue diffuse.
 15. Soft tissue reticulate.
 16. Vertical gum canals in concentric bands. Soft tissue; soft tissue wing-like.



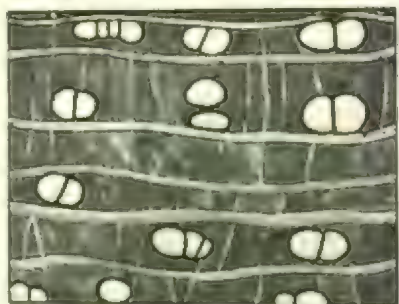
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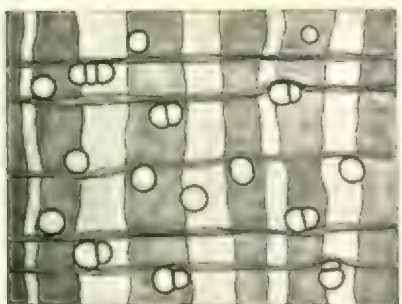
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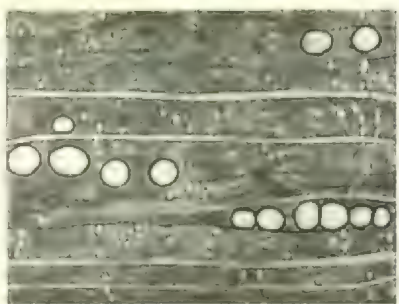
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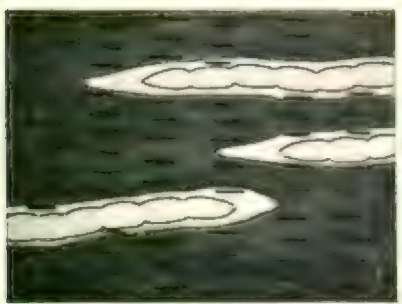
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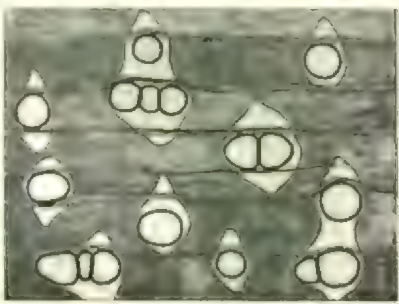
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14



9



13

With gum canals. These can often be seen with a lens on the tangential surface as dark cavities or dots in the rays. Occasionally they can be seen on cross or radial surfaces as dark streaks (e.g. radiata pine and pink poplar).

Soft tissue forms the main storage system of most trees. It runs vertically up and down the stem, and its cells, like those of the rays, are alive throughout the sapwood. It forms definite patterns when seen on the cross surface of the wood. It is distinguished from the main mass of the woody tissue by being formed of relatively thin-walled cells.

Soft tissue usually appears somewhat lighter in colour than the rest of the wood, but it may occasionally contain much resinous matter which makes it darker than the background.

Soft tissue absent or very difficult to see. (Figures 2 and 8 of last article.) If the soft tissue is extremely scanty and is difficult to see, even with a lens, it is said to be absent, even though a little might be seen in an examination with a microscope (e.g. myrtle beech).

In regularly spaced bands wider than the pores. (Figure 10.) (e.g. Moreton Bay fig.)

In regularly spaced bands narrower than the pores. (Figure 11.) (e.g. Miva mahogany.)

In irregularly spaced bands. (Figure 12.) In these three features the width of the bands is judged by comparison with the radial diameter of the pores. Regularity or irregularity refers solely to the spacing of the bands on the cross surface of the wood, and not to their width. (Figures 10-12.) (e.g. white birch and Queensland walnut.)

Surrounding the pores. (Figure 5 of last article.) (e.g. many of the eucalypts.)

Winglike and confluent. This means that the soft tissue projects laterally from the pores and links them together. (Figure 13, and Figure 1 of last article.) (e.g. black bean.)

Diffuse. The soft tissue may be scattered irregularly through the wood, often occurring as single cells or short lines of a few tangentially linked cells. This feature is often a little difficult to see, but can be made out with the lens, if the surface is wetted. (Figure 14.) (e.g. red gum.)

Reticulate. This arrangement of the soft tissue is an elaboration of the one above. The tangential linkage of the cells is more marked, the tissue forming fine, often broken, lines. These are usually only visible with a lens. Together with the rays they give a net-like appearance on the cross section. (Figure 15.) (e.g. mararie and brown alder.)

Other useful features are the presence of *vertical gum canals*, which may be either scattered through the wood or arranged in definite concentric bands. (Figure 16.) These canals may be of two types—(i) *normal*, in concentric bands or scattered, as in many of the Dipterocarps (e.g. red maranti and *Anisoptera* from New Guinea), and (ii) *traumatic*, or the result of a breakdown of the tissues—commonly after injury—as in silver ash and the eucalypts. In these latter they are conspicuous because of their size and reddish-brown contents, and are commonly known as gum veins.

Ripple marks. These are faint vertical markings which can be seen on the tangential surface of some timbers. They resemble ripples on sand and are caused by a tiered arrangement of the rays and sometimes of the other elements of the wood. They are often more clearly seen with the naked eye than with a lens. (Figure 9.) (e.g. true mahogany and, to a less extent, in tulip oak.)

These are the features which have been found to be most useful for purposes of identification of unknown timbers. How to prepare and use the different mechanical keys will be discussed in the next article.

Elements of an Industry...



In daily speech the word "element" is too often used wrongly or carelessly. "The elements" suggest "the weather", and "elementary" something easy or simple. To men of science, however, an element describes any substance which cannot be split up into a simpler one by ordinary chemical methods. A dictionary definition is that an element is "the simplest known constituent of all compound substances." This recognition is based on a theory first propounded by Robert Boyle, a British chemist, in 1661. In all nature there are only ninety-three of these "elements". From these are built up every single thing we eat or use or see. The function of the chemical industry is to discover how to separate elements which in nature exist in a combined form, to find out how they can be made to combine into substances useful to man, and then to evolve methods of making them do so "to order" on a commercial scale.

The degree of success which this great industry has attained may be judged from the fact that Imperial Chemical Industries alone uses 50 or so of the elements known to science to make no fewer than 12,000 different products.

**IMPERIAL CHEMICAL INDUSTRIES
OF AUSTRALIA AND NEW ZEALAND LTD.**



WHAT, WHERE AND WHEN

General Excursions:

Saturday, February 16—Motor Coach Excursion to Cape Schanck, via Dromana, Boneo Rd., return through Red Hill. Coach leaves Batman Avenue 8.15 a.m. Subjects: Geology and Botany. Bring two meals. Reserved seat bookings, 18/-, with Mr. H. Stewart, 14 Bayview Terrace, Ascot Vale. Tel. FU 1096.

Saturday, March 1—Yarra River trip. Launch leaves Princes Bridge 2 p.m. Bring afternoon tea. Tickets, 3/-, available at next General Meeting.

Preliminary Excursions:

Saturday, March 22—Motor Coach Excursion to Mount William and Mollison's Creek. Coach leaves Batman Avenue, 8 a.m. Subjects: Aboriginal artefacts and Botany. Leader: Mr. Burston. Bring two meals. Reserved seat bookings, 18/-, with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1.

Group Fixtures:

Tuesday, February 19—Native Plants Preservation Group, at home of Miss W. Waddell, 3 Denham Place, Toorak, at 8 p.m.

Monday, February 25—Botany Discussion Group. Royal Society's Hall, 8 p.m.

Tuesday, March 4—Geology Discussion Group. Royal Society's Hall, 8 p.m.

Thursday, March 6—Wildflower Group. Royal Society's Hall, 8 p.m.

Friday, March 7—Marine Biology Group. Royal Society's Hall, 8 p.m.

Kenneth Atkins,

Excursions Secretary.

A FAVOURED TREE

On November 17, 1951, I visited the You Yangs with two visitors from Adelaide. Our bird list of some 40 species included the Rainbow-bird (*Merops ornatus*) and one Rufous Fantail (*Rhipidura rufifrons*).

But the most interesting observation for the afternoon was made at a large old eucalypt standing isolated from others of its kind in a sparsely wooded paddock just outside the confines of the Park.

Our attention was drawn to it first by the calling of a pair of Jacky Winter (*Microeca fascians*) who were busy feeding a young bird in the middle branches. Remarkably similar calls were coming from a pair of White-winged Trillers (*Lalage sueurii*) who were "commuting" between this and the nearest tree, evidently trying to settle on a nesting site. A movement on the dead top branch caught our eyes: an Orange-winged Sitella (*Neositta chrysoptera*) was calmly sitting there preening.

Two Striated Pardalotes (? sp.) were feeding young in a spout well under the drooping outer foliage and entering and leaving so quickly that it was quite impossible to count the number of white primaries to distinguish the species!

There was a little flurry on the big branches about the centre of the tree where a Starling (*Sturnus vulgaris*) was berating something which settled on the branch out in the open and revealed itself as an Owlet Nightjar (*Acgotheles cristata*). It was so annoyed with the Starling that there was plenty of time to see its wide yellow gape, the surprised look, the dark patches above the centre of the eyes, the slight transverse barring on the breast, and the heavier markings on the back, particularly the lower part, and the sprouting bristles about the gape.

To our eyes the tree did not differ from many others of its kind scattered about, but it certainly had all the attributes which made it a desirable building project to the birds.

—I.M.W.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, January 14, 1952. The President, Mr. E. E. Lord, was in the chair and about 150 members and visitors attended.

The following were elected as members of the Club and given a warm welcome by the President: Junior Member, Master W. A. McColl; Country Member, Miss G. M. Bowker; Ordinary Members, Mr. Jack Humffray, Mr. A. J. H. Fairhall, Miss Christine Cremer.

The Secretary announced that the Natural History Medallion Committee had awarded the 1951 Natural History Medallion to Mr. Tarlton Rayment, and he read a letter of thanks from Mr. Rayment in response to the Club's telegram of congratulation.

The President announced that our recent Secretary, Mr. Harry Preston, now has a son, and congratulations were extended to Mr. and Mrs. Preston.

Instead of one speaker for the evening various members had been invited to give a short address. Mr. Mollison spoke on "Shells from the Great Barrier Reef" and illustrated his talk with specimens from the large display of shells he had brought with him. Mr. Ken Atkins described various interesting aspects of a recent trip made by a small party to the Mitchell River gorge. One of the most interesting things seen there was a Native Poppy, which is found only in two other places in Victoria. Mr. Scott followed with a resumé of the work being done by the Geology Group. Much help has been given by Mr. Gill of the Museum staff and in return the Group has passed on specimens of fossils and rocks, etc., as well as reports to the Museum. Members were very interested to learn that as a result of this the Director of the Museum has recently appointed the secretary of the Group, Mr. A. A. Baker, as an honorary worker to the Museum. Some photographs were shown by Mr. Scott taken on various Group outings.

Present at the meeting were Mr. and Mrs. Stan Colliver, on holiday from Brisbane. Mr. Colliver spoke of "fossil hunting" in Queensland, and described a remarkable instrument which has been recently installed in the Queensland University for measuring earth tremors, cyclonic disturbances, etc. This is a gift from the city of St. Louis and is the only one so far outside America.

EXHIBITS

FLOWERS: Plants from Mitchell River gorge—Mr. K. Atkins. Garden-grown native plants, dried Coral Pea (*Kemedyia rubicunda*) and seeds for distribution, Native Violet (*Viola hederaceae*)—Miss J. Raff. *Ceratopetalum gummifera*, *Backea camphorosmae*, *Verhucardia densiflora*—Mr. J. Scatton. Buds, flowers and fruit of dwarf sugar-gum (*Enc. cladocalyx nana*)—Mr. A. E. Brooks. *Backea virgata*, Himalayan Jasmine—Mr. A. Chalk.

PHOTOGRAPHS: *Narkera hutchinsonii*, moss collected by Mr. Willis—Mr. R. D. Lee. Grass-trees flowering in Botanic Gardens—Miss M. Wigan.

ROCKS: Snowy River Porphyry, Lower Devonian age—Mr. A. Baker.

FOSSILS: Plant remains, *Cladophlebis* and *Taeniopteris* (Jurassic period) from Inverloch—Mr. D. F. Jeffrey. Permian, Triassic and Tertiary flora from Bacchus Marsh—Mr. R. Davidson.

SHELLS: Collection from Great Barrier Reef—Mr. J. Mollison.

PLEASE NOTE CAREFULLY — DATES OF MEETINGS

In both March and April this year the second Monday will be a Public Holiday—in March, Labour Day; and in April, Easter Monday.

In each month the Club Meeting will be held on the following evening, i.e., Tuesday, March 11, and Tuesday, April 15.

To simplify matters for advance press notices and for the convenience of members generally, Council has decided that, unless specially notified to the contrary, this will be the custom to be followed in the future where the usual meeting night falls on a Public Holiday.

HOW TO SEE

"Every day we walk abroad, even in parks or between town gardens, there is something new to be seen. The town wild things are wary and confiding at once; when we visit the country I am convinced that we see most when we do not try to see too much. . . . Slowly I became convinced that it is more important to hold the mind quiet than the body still. Some extra sense makes the creatures uneasy if there is a tense watcher among them. . . . Possibly human scent alters with mood, or a kind of telepathy is at work. I only know that the thing happens, and that other naturalists believe this, too.

"The casual step, the mind deliberately quickened in the excitement of a new encounter, grateful to be given secrets it does not snatch, these make us at one with the woodfolk. In the school of the woods there is no graduation day, but we are accepted as pupils, free to learn, free to enter into that converse with the creatures which leads to knowledge and praise of our Creator."—P. Stewart Brown, in *The Girdler*, 1951.

AN UNSKILLED PERFORMER

Recently, on a visit to Sherbrooke Forest, a young Lyrebird was seen displaying on a mound in a secluded part of the Forest. When in the display position, the partly developed tail feathers of this bird scarcely reached back to his head, and in place of the beautiful singing of more mature members of his species he was only uttering a clucking sound. On finding that he was being observed, the young bird lost no time in folding away his short tail feathers, and fled through the Forest with amazing rapidity. It seemed as if he was self-conscious about the imperfect performance that he was giving, and too vain to continue in the presence of an audience as many adult male Lyrebirds seem happy to do.

—A.E.B.

EUCALYPTS OF MT. WILSON AND MT. IRVINE, N.S.W.

By E. J. GREGSON

Introduction

This article has been written in the hope that it may interest visitors to the Blue Mountains and in a small way help in solving the riddle of the gum trees, their history and relationship to their surroundings.

Mt. Wilson was first surveyed in 1868 and the first houses built there in the "seventies." It is a famous tourist resort on account of its gardens of English trees. Mt. Irvine was settled in 1896.

The author and his father (the late Jesse Gregson) have been able to explore a great part of the district referred to and thanks are due to the botanists at The National Herbarium of New South Wales (Botanic Gardens, Sydney) for their assistance in the field and in the identification of the many specimens collected, particularly during the last two years.

The works of Curran (1899), Carne (1908), Süssmilch (1922) and Woolnough (1927) have been consulted in drawing up the following brief account of the geology and physiography of the area dealt with (see map). This is a ridge or spur of the Blue Mountains running North-east between the Bowen and Wollangambe creeks and include the sandstone country between these streams as well as the basaltic area.

The Blue Mountains consist of an uplifted and dissected peneplain of which the greater part consists of highly siliceous freshwater sandstones of Triassic age (Hawkesbury series).

The uplift has been differential in both time and elevation but the general plateau level in the area under consideration varies from 2,900 feet (at Mt. Irvine) to 3,400 feet (above sea level at Mt. Wilson). The ancient Tertiary valleys of pre-uplift times are partly preserved in the present contour of the "tops" country. The recent (post-uplift) gorges have been cut to considerable depth in the sandstones and thus provide a variety of micro-climates according to the degree of shelter from drying or rain-bearing winds the amount of sunshine received and the varying composition and moisture content of the sandstone country. The underlying Coal Measures and Upper Marine Series of Permian age are not exposed here as they are in the Grose, Upper Colo and other major valleys of the region.

The above features are common to the whole of the Blue Mountains region, but our area is notable as it includes one of the most accessible and extensive basaltic areas in this part of N.S.W. The basalt is a remnant of a once more extensive lava flow which was erupted from volcanic necks and fissures in late Tertiary times. This volcanic activity preceded the most recent

uplift and much of the basalt has been eroded away by the rejuvenated streams.

The isolated basaltic cappings of Mt. Wilson and Mt. Irvine now amount to some 1,000 acres only, but have provided in their decay a fertile soil of much greater extent which supports the beautiful vegetation we see to-day—so strikingly different from that of the surrounding sand-stone country.

At Mt. Irvine, Wianamatta shales (Triassic)—a remnant of a once more extensive formation overlying the Hawkesbury sandstones—are preserved under the basalt and an old Tertiary river channel of pre-uplift times containing boulders of quartzite and slate has been traced for some miles. At "The Waterfall", Mt. Wilson, there is evidence that the basalt lies on the Western fall of the same or a similar valley of which nearly all traces have now been lost by erosion:

The uplifting of the present tablelands brought about a considerable change in the flora and fauna of N.S.W. From a comparatively moist, subtropical climate the Western parts became more arid and the tablelands much colder. The formerly more widespread luxuriant vegetation similar to the present coastal "brush" became restricted, whereas the eucalypts, acacias, etc., were able to survive and in their becoming adapted to the changed conditions many new species have been differentiated.

The floristics and ecology of Mt. Wilson have been discussed by Hamilton (1899), Brough, McLuckie and Petrie (1924), and Petrie (1925) and a census of vascular plants was compiled by the author's father (Jesse Gregson ms.) Two formations, Rain Forest and Sclerophyll occur. The former is characteristic of the sheltered basalt area, but in its pure state includes no eucalypts and hence does not concern us. The latter includes: (a) wet Sclerophyll, where the finest trees occur, on the more exposed portions of the basalt and on the most sheltered portions of the sandstones where some basaltic wash has enriched the soil, and (b) Dry Sclerophyll, varying from a moderately tall forest to low scrub communities, some without any eucalypts.

The works of Blakely (1934), Anderson (1947) and Chisholm (1924) contain data on the *Eucalyptus* species but no specific account of those of Mt. Wilson has previously appeared. Petrie (1925) has discussed their ecology but his identifications were not all accurate.

Though it is quite possible that species, other than those mentioned, may still be found in isolated spots, the following list is now thought to be fairly complete, viz. 20 species of *Eucalyptus*, 2 of *Angophora* and a few hybrids. The identifications of all have been checked at the National Herbarium of New South Wales and the majority have also been examined in the field by Mr. L. A. S. Johnson of that institution, in the writer's company. To Mr.

Johnson special thanks are due for the trouble he has taken in enlarging and correcting this introduction.

Annulated Enumeration

On the basaltic soil at Mt. Wilson four species occur—*E. blaxlandii*, *E. viminalis*, *E. gomicalyx* and *E. radiata*. The first two (in company with *E. radiata*) dominate the forest on the mountain tops, while *E. gomicalyx* prefers the warmer slopes or more sheltered valleys adjoining the "brush" (rainforest). The remainder of the species enumerated grow on the sandstone country.

The species are divided for convenience into *Gums* (or *smoothbarks*), *Stringybarks* and other *Roughbarks* and are referred to in detail below.

* Indicates the common name used at Mt. Wilson.

GUMS OR SMOOTHBARKS

E. VIMINALIS Labill. (mannum gum,* white or ribbon gum).

This species ranks in grandeur with *E. blaxlandii*. Some very fine specimens of this beautiful tree are found on "Denmarque" or Mann's Hill. It also grows on "The Zig Zag", on "The Point" above, along the upper Waterfall Creek and above the "Bogey Holes" but never far from the basalt and never at lower elevation towards Mt. Irvine. The timber though tough is not regarded as first class. Blooms: Feb., Mar., and April.

E. OREADES R. T. Baker (Blue Mountains ash, white or smoothbark mountain ash *). Formerly *E. leuhmanniana* var. *altior*.

A tall tree with ribbony bark conspicuous in the gullies and on the slopes. It has been planted in avenues on the mountain and is a valuable timber. Some fine stands of this tree occur along the road half way to Mt. Irvine. Blooms: Jan. and Feb.

E. GONIOCALYX F. Muell. ex Miq. (mountain grey or yellow gum *).

This is the only commercially known hardwood in the locality. Its range about Mt. Wilson is almost as extensive as that of *E. viminalis* and it extends to Mt. Irvine, where some of the largest trees have been milled. A fine tree and excellent timber. Though found on the ridge tops, it grows well in good soil below the basalt and is sometimes found in the sandstone gullies, e.g. "The Lake", Wollangambe Creek, and in the shelter of the upper "Flats". Blooms: January.

E. MACULOSA R. T. Baker (white brittle gum, mountain spotted gum* or swamp gum). Formerly included in *E. gummi*.

This grows into fine picturesque trees in the upper part of Waterfall Creek and in the hollows off the mountain proper, e.g. at the "Bogey Holes" and upper "Flats". It associates sparingly with *E. haemastoma* on the sandstone ridges. It is a hard timber but on account of its crooked growth and scarcity is not used commercially. Blooms: Feb., Mar., and Apr.

E. HAEMASTOMA Sm. var. *SCLEROPHYLLA* Blakely (Scribbly gum,* cabbage or snappy gum).

This straggly white gum is typical of the poor sandstone country and though often very attractive rarely exceeds a height of 50 feet. The timber is soft and reddish and makes excellent firewood. Mallee-like thickets of this tree sometimes occur in burnt-over country. Blooms: Feb. and Mar.

E. PUNCTATA DC. (grey gum *).

A good timber found in limited areas at Mt. Irvine. Blooms: March.

E. RUBIDA, Deane and Maiden (randlebark or red gum *).

A large stand of these trees extends along the creek for 1 mile below the "Bogey Holes." It is associated with *E. maculosa* and *E. radiata*, but does not appear to flourish in this district. Blooms: Feb., Mar., and Apl.

E. PAUCIFLORA Sieb. ex Spreng., var. (snow gum mallee *). Formerly included in *E. coriacea*.

This dwarf form only 6 to 10 feet high has been found at the "Roman Wall" near the "Bogey Holes" and in the upper "Little Flat" not far off. It has deciduous flaky bark leaving smooth patchy white and grey stems and branches. Blooms: Aug. and Nov.

E. STRICTA Sieb. ex Spreng. (mountain mallee ash or mountain mallee *). Formerly misidentified as *E. virgata*.

A small species found near "Appletot" and at "Wynne's" and "Du Faur's Rocks" and in better soils reaching a height of 25 feet. Broad and narrow leaved forms are common on the sandstone. The bark is deciduous, ribbon on larger trees, leaving smooth, often patchy, yellowish green or slaty grey stems. Blooms: Dec. and Jan.

E. MOOREI Maiden and Cambage (dwarf gum *). Formerly *E. stellulata* var. *angustifolia*.

A smaller mallee species than *E. stricta*, up to 10 feet high and found on the "Flats" off the mountain and near the "Bogey Holes." It has green or slaty stems very similar to *E. stricta*. Blooms: Mar. and Apl.

E. MONTANA (Deane and Maiden) Blakely.

Resembles in habit *E. morrei* with which it associates not far from the Snow Gum in the "Little Flat." Blooms: ?

STRINGYBARKS

E. BLAXLANDII (brown stringybark). Formerly included in *E. capitellata*.

The dark green, shining foliage of this species is a feature of the ridge tops, though some of the largest trees are isolated specimens found on the slopes in the brush or rain forest. It extends to Mt. Irvine where it occurs on the western side of the mountain. It is also found on the better soil of the sandstone country. A show tree at "Wynstay" (now only a stump) was about 50 feet in circumference 6 feet from the ground and some reach a height of 150 feet. The timber is highly valued and lasts well in the ground. It was much sought after for sleepers when the railway was being constructed over the mountains. Blooms: Mar. and Apl.

E. SPARSIFOLIA Blakely (narrow-leaved or red stringybark *). Formerly included in *E. eugenioides*.

Fairly common on the sandstone ridges surrounding Mt. Wilson and valued for both timber and bark when growing large enough. Blooms: Dec. and Jan.

E. AGGLOMERATA Maiden (blue-leaved stringybark *). Possibly formerly included in *E. capitellata*.

A tall tree found on the northern slopes of the gullies below Clark's Hill ("El Southee") and below Morley's, Mt. Irvine. It is a valuable

timber with very thick bark but is an uncommon tree in this area. The foliage is shiny, with a silvery sheen which persists in dry specimens. Blooms: Mar and Apl.

E. LIGUSTRINA DC. (dwarf stringbark *). Formerly *E. eugenoides* var. *nana*.

A few small trees, up to 20 feet high, occur on a sandstone spur named "Baronia Point" close to the Wollangambe Creek below Clark's Hill. Its juvenile leaves, less than an inch long, have wavy margins and conspicuous oil glands. Blooms: April.

OTHER ROUGHBARKS

E. RADIATA Sieb. ex DC. (narrow-leaved peppermint *). Formerly included in *E. mygdalina*, or known as *E. australiana*.

This tree, although not reaching the dimensions of some already referred to, is often a large and graceful tree and is a valuable timber. With its companion (*E. piperita*) these two species probably outnumber all the other species together on Mt. Wilson proper. Besides occurring on the volcanic soil it also grows well off the basalt, sometimes approaching 100 feet in height and frequently occurs in the sandstone gullies and upper "Flats". It extends to Mt. Irvine where it is found on the S.W. end of the mountain. Blooms: December.

E. PIPERITA Sm. var. *OROPHILA* Blakely (Sydney peppermint or broad-leaved peppermint *).

This is also a large tree sometimes and seems to prefer the poorer soils of the sandstone country where it is often the prevailing species associating with *E. haemastoma* and *E. sieberiana*. It was always regarded as second rate timber but recently has been well spoken of. Blooms: Jan and Feb.

E. SIEBERIANA F. Muell. (silvertop ash or black ash *).

Though sometimes growing into a fairly large tree, it is not accepted by the timber mills in this district. It is conspicuous in the sandstone country with its dark, scaly, furrowed bark on trunk and clean upper branches. Blooms: Oct. and Nov.

E. PASTIGATA Deane and Maiden (brown barrel, messmate* or cut tail). Formerly included in *E. regnans*.

The "Giant tree" of Mt. Irvine and Mt. Tomah, this belongs to the "ash" group of eucalypts though locally called messmate. It has rough bark (persisting well up the trunk and larger branches) somewhat similar to stringybark. It is closely related to *E. regnans*, the "Giant Tree" or mountain ash of Victoria and Tasmania which differs from it in having smooth bark on most of the trunk. In girth and height it sometimes surpasses *E. blaxlandii*. It is milled near "The Fernery" Mt. Wilson where there is a show specimen in the Reserve close by. Though attaining its largest size on the basalt or adjoining shales it is also found growing on poorer sandstone soils. Blooms: January.

E. GUMMIFERA (Gaertn.) Hochr. (red bloodwood *). Formerly *E. corymbosa*.

Rarely a large tree, this occurs at about 2800 feet on Mt. Irvine road $3\frac{1}{2}$ miles from Mt. Wilson, from the "Long Saddle" continuing on the eastern slopes to Mt. Irvine. It is also found on the ridge near the junction of the Bowden and Waterfall Creeks, 2 miles from "The Mill", Mt. Wilson. Blooms: April.

HYBRIDS

E. OREADES × *PIPERITA*, Near "Applecot" and Kirk's "Old Place". Hybrid swarms occur amongst regrowth stands.

E. BLAXLANDII × *SPARSIFOLIA*, Near "The School" and at "Wynstay". Odd trees perhaps including segregates.

E. BLAXLANDII × *OREADES*, "Cascade Rocks" on road to "The Mill". Parentage of this tree is dubious.

These hybrid trees and stands have been examined in the field by Mr. L. A. S. Johnson of the N.S.W. National Herbarium. Segregation was discernible amongst seedlings of the *blaxlandii* × *sparsifolia* tree from the school. Other seedlings were not available.

ANGOPHORA SPECIES

A. COSTATA (Gaertn.) J. Britt. (smoothbark apple,* Sydney red gum or rock apple). Formerly *A. lanceolata*.

Only found at lower elevations in this district. Nearest localities to Mt. Wilson are below Clark's Hill on the West and 2 miles below "The Mill" on the East. Blooms: Nov. and Dec.

A. INTERMEDIA DC. (roughbark apple *).

A large straggly tree occurring sparingly below Clark's Hill and in Bowen's Creek Valley. Blooms: January.

BARK COLOURATIONS

Reddish colouring occurs on the trunk and limbs of *E. riminalis*, but is most marked in this area in the younger trees of *E. maculosa* where the whole trunk is sometimes a very noticeable red affording a distinguishing feature from *E. haemastoma*. It is found on the old bark before this is shed in February leaving the creamy or greenish new bark underneath. Colouring is not very evident in this district in *E. rubida* which is often bright red at higher elevations, e.g. near the Jenolan Caves. *E. punctata* is sometimes very noticeable with patches of yellow or pink contrasting with its ordinary grey bark.

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AWARD OF NATURAL HISTORY MEDALLION 1951

Tarlton Rayment, F.R.Z.S., nominee of the Field Naturalists Club for the Natural History Medallion for 1951, has never wavered in his allegiance to the Hymenoptera. He tells a story of his first introduction to the honey bee. As a child, he was taken by his mother to the extensive garden of a family friend. While the ladies had afternoon tea, the owner invited Tarlton to see some of his



pets, which turned out to be colonies of bees, housed in two hives built to resemble miniature white cottages—doors, windows and all complete. He still remembers his utter amazement when the roof was raised, and he looked into the interior, with its teeming hordes of bees. He was dumbfounded when a honeycomb was lifted out, on which the bees had built the owner's initials in beautiful white wax. That day, Tarlton Rayment decided that he too would have similarly clever bees.

For many years he conducted several extensive apiaries, and it was from experience gained during that period that he was able to investigate the so-called

"disappearing disease" in bees, but which he demonstrated to be a phase of malnutrition, brought about by the introduction of a highly evolved European insect to the xerophytic flora of Australia.

He has described several hundreds of species new to science, and has entertained us with intimate stories of their biology. Many of these were published in his monograph, *A Cluster of Bees*, which is the accepted text-book on the subject. It is of interest to learn that many hundreds of his original drawings are preserved in the library of Cornell University, U.S.A.

His work is not limited to the Hymenoptera, for he has given us a pioneering novel, *Valley of the Sky*, and this has reached eleven editions in many languages, while his story of the little aborigine "Gor-ree" (Prince of the Totem) has sold over 70,000 copies—a remarkable record for an Australian novel. This is now being republished as a reader for use in the State Schools. His bibliography is a sure index of his remarkable industry.

At the moment, he is conducting a research into the biology of a group of Sericophorine wasps, which he believes will ultimately become the biological control of the ubiquitous blow-fly pest.

LYNETTE YOUNG.

"WITH A CARGO OF IVORY . . . SANDALWOOD . . . AND SWEET WHITE WINE"

By M. M. CHATTAWAY

What a strange history sandalwood has, going back through the ages as one of those plants for which men made long journeys and underwent dangers and privations, and now, with the original supplies almost exhausted in southern India, exported in ever increasing quantities from West Australia.

For centuries the sandalwood, with its pleasantly fragrant dried heartwood, was much sought after. In the Orient, particularly in China, Burma and India, the wood was used for making idols and sacred utensils for shrines, boxes, carvings and turnery, as fuel for funeral pyres and joss sticks to be burnt in temples. The distilled oil was used in numerous medicines, perfumes and cosmetics, and as a body rub. In India the oil, mixed with a paste, was used by Brahmins for their caste marks.

'Almug' wood is said to have been used by Solomon in the building of the Temple, and this may perhaps have been sandalwood, though it might have been one of the many other fragrant woods which have from time to time been offered as substitutes for sandalwood. More authentic reports give the sixth century for the earliest introduction of sandalwood to the Middle East. But it was well known in the Chinese trade by the twelfth century, Chinese Buddhist priests using it for their temple rituals and calling it *chan fan*, and later *fan hsiang*—the fan fragrance. To most people it is just vaguely an Eastern wood, to the more accurate a wood of southern India, but it is now considered to have been introduced into India many centuries ago and cultivated there for its economic value, and that the original sandalwood of India may have been *Pterocarpus indicus* of the Leguminosae, the more fragrant *Santalum album* of the Santalaceae having originated in Timor and one or two of the neighbouring islands, where it is undoubtedly indigenous. It is odd that there is no occurrence of sandalwood in the gap of 3,000 miles between Timor and south India, and further, that there is no mention of the tree as indigenous to India in the earlier records. *Chandana*, the Sanskrit name now applied to *S. album*, which is mentioned in early Sanskrit writings probably refers to another species of fragrant wood, being subsequently applied to sandalwood when its import into India became more frequent. It is interesting to find that, in an ancient document called *Ain-i-Akbari*, compiled by Abul Fazl (Akbar's Minister of State in 1551-1602), mention is made of sandalwood being successfully planted in India; its origin was there said to be China. The range of *Santalum album* in south India has been extended greatly in the last century. It is more easily cultivated

than *Pterocarpus indicus*, and this may be partly responsible for its rapid spread.

In the past the Dutch had almost a monopoly of the sandalwood trade, procuring its from south India and the Pacific islands, and exporting it to China. But as the amount available from India began to decrease its place was taken by the West Australian sandalwood, *Santalum spicatum*, which has at different times been called *Eucarya spicata* and also *Fusanus spicatus*—thus do the systematic botanists seek to confuse us. Nowadays India supplements its native supplies by importing *S. album* from Singapore and, in even greater quantities, by importing from Singapore quantities of *Santalum spicatum* and *S. acuminatum*, which have been imported into Singapore from Australia.

When I was working at the Imperial Forestry Institute at Oxford, we constantly received enquiries about woods from both private individuals and from the timber trade. Once we were sent a sample of a fragrant wood, with an enquiry as to its identity. The importer had received it among a consignment of sandalwood, and doubted if it was "true" sandalwood, as it was a common habit among unscrupulous dealers to impregnate the surface of an inferior wood with sandalwood oil and sell it as sandalwood. We were able to set his mind at rest; the wood was not *S. album* it is true, but it was the equally good *S. spicatum*, then called *Eucarya spicata*, which had been imported into India and re-exported thence to England.

Species of *Santalum*, and indeed other members of the Santalaceae, are among those curious plants which cannot feed themselves. They have no true root system, but attach themselves by *haustoria* to the roots of other plants, tapping their sapstream for nutrient solutions. They appear to be very catholic in their choice of hosts, being able to grow on a very wide range of plants from many different families. When they are grown in the unnatural conditions of a seedsman's nursery the seedlings will germinate, but, unless other plants are near enough for the *haustoria* to develop on their roots, the seedlings wither as soon as the food stored in the seeds has been used up. For growth to maturity they must be grown among other plants, as they do in their natural habitats.

A GRACEFUL NATIVE SHRUB

Those who consider that few of our native shrubs are compact and bushy should see a plant of flax-leaf heath-myrtle (*Baccharis limicola*) in the Australian border at the Melbourne Botanical Gardens. The colourful buds and stems, the fine shining foliage, and the very compact nature of this shrub make it a real gem. The flowers are like small tea-tree (*Leptospermum*) flowers. This specimen is situated in the Australian border not a great distance from the Park Street entrance.

—A.E.R.

VISIT OF AN EARLY NATURALIST TO VICTORIA

By LIONEL A. GILBERT, Napiac, N.S.W.

During a few days in 1837, the newly settled Port Phillip district was visited by a missionary-naturalist in the person of James Backhouse. Although the visit was short, his account of it is very interesting. Mention of Backhouse is made by Mr. J. H. Willis in his contribution under "Botanical Pioneers in Victoria (*Vict. Nat.*, Sept., 1949), and here it is proposed to deal with this missionary's Port Phillip sojourn in a little more detail.

James Backhouse was born in Yorkshire on July 8, 1794. After commencing work in a business, he suffered a deterioration of health, so decided upon an out-door life. This step was made more pleasant for him by an uncle, who assisted the lad to gain a knowledge of botany. Thus, during 1815, James and his brother Thomas bought the nursery of J. and G. Telford of York.

In 1824, James Backhouse became a Quaker minister, and on September 3, 1831, accompanied by George Washington Walker, he sailed for Australia in the barque *Science*. The purpose of Backhouse's voyage was a philanthropic mission to the people of Australia, more particularly to the convicts and aborigines; any scientific observations were purely incidental to this mission, or, as Backhouse put it, the voyage "was undertaken solely for the purpose of discharging a religious duty." However, "having been trained to habits of observation," the missionary made his account of the greatest value to naturalists, theologians and philanthropists alike. Altogether the mission occupied some six years, during which Backhouse visited Van Diemen's Land, New South Wales (which then included what are now Victoria and Queensland), Norfolk Island, South Australia and Western Australia. He made extensive journeys in some of these areas.

On November 3, 1837, Backhouse and his companions left Hobart Town on the *Eudora*, en route for King George's Sound via Port Phillip and South Australia. While crossing Bass Strait, flocks of mutton-birds attracted the naturalist's attention—of those, "some were on the wing and others resting on the water. The latter could not rise without difficulty, on account of the smoothness of the sea."

The *Eudora* entered Port Phillip on November 9, 1837, and anchored near Point Nepean. Backhouse writes:

The rock here is soft and calcareous, and rises into low hills. These are covered with kangaroo-grass, trees and shrubs; the beach is sandy, with shells, among which were the Zigzag Volute and Paper Nautilus. *Casuarina quadrivalvis*, *Banksia australis* and other Tasmanian trees grow here, also a N.S. Wales *Eucalyptus* and several shrubs and plants that are found on Flinders Island. I likewise met with a shrub, belonging to the genus *Croton*, and two *Goodenias* that I had not noticed before. We bathed in shallow water, to avoid sharks, and got on board again, after being wet by a heavy thunder-storm.

The next day, the ship continued up Port Phillip to Gellibrand Point and "made a good passage" after touching upon one unmarked sandbank. It was rather late by the time the anchorage was made, so the two missionaries decided to remain on board that night. Looking back over the day's voyage, Backhouse thus describes Port Phillip:

... a small inland sea; the land is not visible across it, except where elevated. In the course of our day's sail, we were close in with the shore, below Arthur's Seat, a considerable range of hills on the east side. . . trees thinly scattered upon them. These are chiefly the spherical-headed *Casuarina quadrivalvis* of Tasmania, which I have only seen in one other place in N.S. Wales, viz., on Mount Arthur, Wellington Valley, where it grew sparingly, and was very small; here it is vigorous and abundant.

The mention of Arthur's Seat is significant for it was the scene, some thirty years before, of Brown's ardent collecting. The use of the term "Tasmania" is also interesting, for Backhouse mainly refers to the island as "Van Diemen's Land" as was then the custom.

The following day, November 11, the missionaries left their ship and "entered the bush at a place marked by a red flag." There, "a track to Melbourne" was followed. Backhouse found the trees and other plants to be "chiefly like those of V.D. Land," but adds that the presence of "several species of *Loranthus*" caused a difference, as he had noted none on the island. After their walk through the bush, the two missionaries "were conveyed across the Yarra-yarra by a voluntary ferryman, whose practice was to make no charge, but to accept what his passengers pleased, finding that in this way he got the best paid."

On the 13th, Backhouse describes his journey by boat up the river to Melbourne:

The Yarra-yarra River is deep; but it is difficult to navigate for boats, on account of the quantity of sunken timber. It is about sixty feet wide, and margined with trees and shrubs. Among these are heard the tinkling note of the Bell-bird, and the shrill whistle of the Coachman, which is terminated by a jerking sound, sometimes like the crack of a whip. We also noticed the Nankin-bird, a species of Heron, which is cinnamon-coloured on the back, sulphur-coloured on the breast, and has a long white feather, pendant from the back of the head. The river is fresh to Melbourne, where there is a rapid. . . The town of Melbourne, though scarcely more than fifteen months old, consists of about a hundred houses, among which are stores, inns, a jail, a harrack, and a school-house.

During the afternoon of the 14th, the missionaries went "down the Yarra-yarra, in a boat, to obtain some tracts from on board the *Endora*," and Backhouse noted that "the banks are low, and fringed with bushes. Toward the mouth of the river, white-flowered *Melaleuca*, drawn up like hop-poles, to thirty feet in

height." The following day, the two men "called on John Batman, formerly of Buffalo Plains in Van Diemen's Land, who has been much of an invalid since his removal to Port Phillip . . ." Batman showed them "the skull of a Native, found near Gellibrand Point, which was perforated with slugs, and had some of the lead lodged in the bone, evidently proving that the individual to whom it had belonged had been shot . . . The number of Blacks in the vicinity of Port Phillip, including its whole circuit with Western Port, is estimated at from three to five hundred. They are said to be more healthy than those of many other parts of New South Wales . . ."

Backhouse records several plants that supply the natives with food, viz.:

Podolepis acuminata, which is about a foot high and has flowers, in some degree resembling Sweet Sultan, but of a deeper yellow: it abounds in rich soils, especially about the margins of salt marshes, and has a thickened root, compared by some to the potato. Another [i.e., plant furnishing food] resembles a Dandelion, but has very narrow leaves, and a nodding bud: its roots resemble *Scorzonera*, to which it is allied; but it generally diffused in grassy lands. These roots are cooked, by heating stones in the fire, and covering them with grass, laying the roots upon the grass, and a covering of grass upon them, and lastly, one of earth over the whole. When roasted, the last especially, are said to be sweet, and ate very delicious. Kangaroos and Opossums, Emus, and other birds, are also generally eaten by the Blacks, and are abundant. The Emus are fast retreating before the white population and their flocks and herds. The large bird of the crane kind, called here the Native Companion, and a Bustard, denominated the Wild Turkey, are plentiful, there are also Yellow-tailed and Red-tailed Black Cockatoos, Round-headed White Cockatoos, Parrots of various kinds, Pelicans, Black Swans, Ducks, White Hawks, Laughing Jackasses, Kingfishers, Quails, and various other birds, not to omit the Piping Crow, with its cheerful note, and the Black Magpie.

During this same day (November 15) the missionaries walked "about three miles, on the way toward Geelong." Backhouse was impressed by the fine country traversed on this walk and the fat livestock, whose "only formidable enemies . . . are wild dogs, which are numerous, and are destructive among the sheep and calves." That night the men dined with Captain Innsdale, the Police Magistrate, and later "observed the *Aurora australis*, very brilliant, in columns of yellow, on a diffuse, pale crimson ground."

The following day (16th), Backhouse and Walker spent "much of the day in fruitless efforts to obtain attention from the *Eudora*, which was at anchor about two miles from the shore. The signal agreed upon was two fires, that were to be lighted on the sand; but the strong wind carried the smoke so close to the ground, that I concluded they could not be seen." Attempts were given up at sunset, and the evening was spent with "J. Batman, who presented us with some oval baskets, of neat and strong construction, the manufacture of the Blacks of this district." Backhouse's narrative continues:

Possibly the Blacks of this district may excel their countrymen in the manufacture of baskets, from the instruction of William Buckley, a prisoner who was left at Port Phillip by Colonel Collins, in 1802, and who remained among the Natives till the settlement of the country in 1835: he had forgotten his own language, which he soon recovered: he is a man of large stature, and now fills the office of constable at Melbourne. . . . the Blacks often bring in the splendid tails of the Lyre-bird, *Menura superba*, which is called in Australia the Pheasant or the Bird of Paradise: it is said to abound among the hills of this district. J. Batman has some fine Emus, captured here

On November 18, the *Endora* set sail, and the next day "beat out of Port Phillip, having been favoured to avoid running aground on the shoals, which is an accident of very frequent occurrence." When opposite Point Nepean, Backhouse saw a dingo, or wild dog, upon the beach—"of large size, brownish colour, bushy tail, and of very wolfish aspect . . ." So the *Endora* left Port Phillip, and in due course carried the missionaries to South Australia and to King George's Sound. Perhaps the most curious item on board was a collection of thirty dogs which the captain brought from Hobart Town, and which he hoped "to sell to advantage in India."

While Backhouse did not make extensive or detailed natural history observations around Port Phillip, his visit (and what he saw) has provided interesting material for contrast with to-day. Had he stayed longer in the environs of early Melbourne, it is certain that his records would have abounded in information of value to modern naturalists. According to Maiden, Kew possessed a set of two MS. folio volumes entitled "Botany of New South Wales" by James Backhouse, and these doubtless include references to the plants noted around Port Phillip. At all events, Sir Joseph Dalton Hooker was impressed with the missionary's observations as a naturalist—"The results of his journey have proved extremely valuable in a scientific point of view and added much to our familiarity with Australian vegetation."

Mauritius and South Africa were also visited and Backhouse finally arrived back in London on February 15, 1841, after an absence of nine years. He recommenced the nursery, later taking his son James into the business with him. James Backhouse, Jr., was also a naturalist and among his works was *A Handbook of European Birds*, published in 1890. The father died at York on January 20, 1869, at the age of 75. Several plants were named after him, among them myrtaceous genus, *Backhousia*.

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MEMORIES OF THE KINDLY BARON

By H. Best, St. Kilda.

On October 10, as has been my wont for many years, I went to the St. Kilda Cemetery to place a bunch of fragrant lilac on the grave of Baron von Mueller.

Standing at that spot, where 55 years ago we laid at rest all that was earthly of one of the simplest, most generous, kind and remarkable men Australia ever housed, I could see in my mind's eye the cortege leaving Arnold Street, South Yarra, with its large following of mourners. Again I heard the solemn strains of the "Dead March in Saul," saw the open grave, heard the great orations delivered by the best men of the day, and those simple closing words, "To-day we buried a good man—to many he was more." With the clergyman's "Earth to earth, ashes to ashes, dust to dust," the large assemblage melted away.

My eyes fell upon the grave, now overgrown with grass and weeds—I'm not blaming anyone, I felt only regret. How quickly the earth turns, how quickly time flies, how quickly we are forgotten! The most erudite and samty men are usually crucified, or heard of only long after their death. Contemporaries of the Baron in his adopted country could not or would not see the wonderful and monumental work he was doing in the interests of science and industry. To make my meaning clearer, let me quote some excerpts from lectures delivered by the Baron in the early 'seventies:

"It has ever been my aim to serve as far as it was within my means the best interests of my fellow Colonists, and while responsibility rests on me in that direction, I wish to meet it in such a way that those who live after us shall never be able to tax me with blindness to any important interests of my Colony."

"Let it be not forgotten, how without a due proportion of woodlands no country can be great and prosperous. I regard the forest as a heritage given to us by nature not for spoil or to devastate, but to be wisely used, reverently honoured and carefully maintained. I regard the forests as a gift, entrusted to any of us only for transient care during a short space of time, surrendered to Posterity again as an unimpaired property with increased riches and augmented blessings to pass as a sacred patrimony from generation to generation."

"The maintenance of forest riches should engage not only the keenest forethought, but also a well-guided and scrupulous vigilance."

"Time will tell whether the present Colonists have done their duty to their descendants, and have been faithful to the future interests of their adopted country; or whether they sank all their ideas and efforts in temporary gain, regardless of all consequences."

"If Captain Cook could come back and view once more the scenes of his discoveries, he would be charmed by the sight of noble cities and the happy aspect of rural industry. But he would turn his eyes in dismay from the destruction and aridity which merciless sacrifices of the native forests so sadly brought about—a sacrifice arising from an utter absence of all thoughts for the future."

"Like the nomadic wanderer of the Australian soil passed away before us, so I fear most of the traces of our beautiful and evergreen forests will be lost ere long. . . . Capitalists in time to come would likely find it safer and more profitable to secure land for timber growth than to invest in any other speculation."

All great words of wisdom, foresight—yes, even prophetic. Spoken practically 80 years ago, they were scorned—unfortunately for a long time—but are now honoured. For we all know what forests mean to us and to humanity in general.

During the whole of his life the Baron wrote and spoke of botanical matters, which will always be important in science and industry. To him the vegetation invested our earth with beauty and an abundance of all that we need, for he said one day:

"The plant world gives us fuel, food, drink and houses to live in, clothes, medicine, scents and many other good things."

(Yes, some of those good things have become apparent in our plastic age, of which this eminent thinker could not have had any possible knowledge!)

Mueller, although German born, was as good and as true an Australian as there ever was. A loyal British subject, he loved Australia dearly—the land that gave him back his impaired health, the land that enabled him to become an explorer, a geographer and above all one of the world's greatest botanists.

Confucius said: "I have the fidelity of a dog and am treated like one." The Baron's life as Government Botanist was certainly not a bed of roses. It was made unnecessarily thorny by politicians to whom science was a blank page, but to whom "£.s.d." meant everything. But the Baron remained faithful to his trust, and to be faithful under such conditions is to be great indeed. He was a kind of mental giant with the heart of a child; a man of highly sensitive, inherently poetic, nature. His many speeches and lectures breathe lyrical prose, while even his Latin field labels on plant specimens read with a lilt. How I treasure the memory of my friendship with such a man!

WOODEND EXCURSION

On November 17, 1951, an excursion to the Woodend-Macedon area was attended by 18 members and friends.

With a very fine day, an enjoyable time was spent, as there was an abundance of wildflowers growing along the way. Travelling by train to Woodend, the walk was along the railway line near the foot of Mt. Macedon, through timbered country to Macedon station, a distance of five miles.

Flowers, numerous most of the way, included *Bulbine bulbosa*, *Podolepis acuminata*, *Stylidium graminifolium*, *Pinetia humilis*, *Helichrysum scorpioides*, *Burchardia umbellata*. An interesting plant was the Tall Daisy (*Brachycome diversifolia*), growing in swampy ground.

The protection given to many plants by the absence of grazing in the railway reserve was very noticeable.

—D.S.L.

ERRATICS

On the Cornadai excursion (how do you pronounce this name?) Mr. Baker showed us ample evidence of the glacial age in Australia. Some of the rocks collected, which did not fit with others in the area, may have been transported by glaciers from the Antarctic or from land to the west of Tasmania now sunk beneath the waves.

These rock samples, known as erratics, bring to mind two other famous erratics. One, known as "The Stranger" and estimated to weigh about one hundred tons, is situated at Derrimal, about six miles on the Bendigo side of Heathcote. It consists of a type of granite not known elsewhere in Victoria.

The other is situated in the Public Gardens at Queenstown, New Zealand, on an attractive cape which projects out into Lake Wakatipu. This large erratic has been inscribed to serve as a memorial to Captain Scott of immortal Antarctic fame.

—A.E.R.

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PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Monday, February 11, 1952. The President, Mr. E. E. Lord, was in the chair and about 180 members and friends attended.

Members stood in silence in reverence to our late King George VI.

The President extended a warm welcome to visitors and expressed pleasure at seeing a number of members present who have been unable to attend meetings for some time.

The following were elected and welcomed to the Club as Ordinary Members: Misses L. M. Kurth and R. E. McEwen, Messrs. P. S. and G. Harwood.

At this stage the President asked the Director of the National Museum to present the Australian Natural History Medallion to Mr. Tarlton Rayment.

Mr. R. T. M. Pescott, before making the presentation, spoke of the meritorious research into the life and habits of bees, wasps and thrip undertaken by Mr. Tarlton Rayment, whose writings accompanied by a wealth of illustrations of great accuracy will be an outstanding monument to him for all time.

Mr. Rayment thanked Mr. Pescott, Mr. J. K. Moir, O.B.E. (the donor) and members of the Club, stating that he was very happy at receiving honour from fellow naturalists.

The Secretary announced that the General Meeting for March will be held on Tuesday, March 11, 1952, and the date of the meeting in April will be notified in due course.

The Secretary read a letter from Mr. G. A. Hebditch, Hon. Secretary of British Empire Naturalists Association, inviting members of this Club to forward short articles on Australian subjects for publication in their journal *Countryside*. Mr. Hebditch gave his address as 92 Rydes Hill Road, Guildford, England.

The President drew the attention of members to a petition being prepared for the prevention of destruction of the small colony of Tasmanian Blue Gums at Lorne and requested members to give their support by signing.

At the President's invitation, Messrs. Gabriel, Scott and Burston spoke briefly of their exhibits.

Mr. Rotherham, a member of the Melbourne Camera Club, invited members to attend meeting held at 123 Little Collins Street, Melbourne, on the last Monday in each month to give advice and assistance in the photography of Natural History subjects.

The guest speaker for the evening was Mr. Tarlton Rayment, who chose as his subject "A Wasp Will Save the Sheep". After recounting how he came to study the wasp, Mr. Rayment told of his discovery that the wasp catches and kills blowflies—one of the greatest pests of the sheep industry—and outlined his plan to re-establish the balance of nature by establishing numerous reserves of one acre for wasps throughout the sheep country. Mr. Rayment illustrated his lecture by showing his detailed drawings of the wasp projected through the epidiascope.

Members' interest and appreciation were apparent by the hearty applause that followed the lecture.

EXHIBITS

FLOWERS: *Bursera spinosa*, *Calothamnus gilesi*, *Humco elegans*, *Pittosporum rhombifolium* from Botanic Gardens—K. Atkins. *Benifortia sparsa*—J. S. Seaton. *Humco elegans*—Mrs. Lewis. Seeds of *Pandorea pandorana* "Wonga vine"—Mr. Swaby.

SHELLS: *Cypraea angustata* Gmelin (the Victorian Cowry) showing the stages of growth—Mr. C. J. Gabriel.

ARTIFACTS: "Blanks" for artefacts from aboriginal quarry on Mt. William—A. Buxton.

HARVESTMEN: Male and female specimens of Onilionids, new species *Spinicrus stewarti* from Mt. Buffalo, 4,500 feet—Tarlton Rayment.

CENTRAL AUSTRALIAN SPECIMENS: (a) Rocks of the Centre, (b) Fossils from the Ordovician from Henbury, (c) a slab of Ayers Rock, (d) Honey ants—M. Kathleen Woodburn.

DATE OF MEETING—PLEASE NOTE CAREFULLY

As the hall is not available, the meeting in April has been brought forward to MONDAY, APRIL 7, and not April 15 as published last month.

THE AMATEUR'S MICROSCOPE

A Review

By A. D. HARDY

About the middle of the 17th century and a little later than the invention of a primitive form of compound microscope, the Dutch naturalist Antonius van Leeuwenhoek, using a simple lens, discovered 'animalcules' in stagnant water. Since then the use of the microscope in biological research has advanced with improvements in the mechanics until, by means of the electron microscope and correspondingly improved methods of illumination, objects having a diameter of less than the 1/60,000 inch may be effectively seen.

The Amateur's Microscope by R. F. E. Miller (Percival Marshall & Co. Ltd., London, 1951, 7/6) is a very useful guide for a beginner. The author has devoted 136 pages of letterpress and illustrations in seven chapters to 'Brief Early History of the Microscope', 'Simple Optics of the Microscope', 'Accessories', 'The Microscope in Use', 'Making your own Microscope' and 'The Preparation of Specimens', together with an 'Appendix' in which there is an illustrated description of the electron microscope and, by way of indication of its capabilities, a photograph of zinc oxide smoke taken through one of these instruments, giving a magnification of 21,000.

This useful pocket-sized book can be confidently recommended for the guidance of those for whom the author has intended it—the amateur—who will find specially informative the chapter on Optics in which spherical aberration, focus, N.A. achromatism, etc., are briefly and succinctly explained.

'THE SMALL BROWN AZURE

(*Ogyris atanes* Feld)

(Description and Notes on the Life History)

By A. N. BURNS, B.Sc., F.R.E.S., and F. ANGEL

Early in November, 1949, a week's collecting trip to Kangaroo Island, South Australia, was made with the main object of collecting specimens of this comparatively rare species of *Ogyris*, and, if possible, to find its life history stages.

It has been recorded from the mainland of South Australia, where it is definitely a rare insect, Kangaroo Island, where most of the existing specimens have been taken (mostly by F. Angel) and three poor specimens from the Stirling Ranges, Western Australia. (Waterhouse.)

It appears to occur mainly on the eastern part of the island, and was commonest in the vicinity of Kingscote. Cygnet River (near the airfield) and Emu Ridge along the main southern road.

The butterflies usually appear on the wing about 10 a.m., and continue in evidence throughout the warmer part of the day, disappearing again about 4 p.m. In habits it resembles *Ogyris idina* Hew, flying about three feet above the ground, on which it settles frequently, also on sticks and stones. F. Angel pointed out a small *Exocarpus*-like shrub which occurred plentifully where the butterflies were flying, and stated that, on a previous visit to the island, he had seen a female butterfly crawling about on the stems and twigs of this plant, but failed to find any eggs. We therefore assumed that this might prove to be the foodplant, so I suggested that if we could find a species of *Campanotus* ant (similar to the one which is found with *O. idina waterhousei* (Mules, Little Desert, Victoria, 1945) in association with these plants, we might be successful in finding either larvæ or pupæ, or both. Accordingly a search was made, and before long *Campanotus* ants were found in nests at the bases of some of these shrubs. The second one examined yielded one larva, fully grown; and later, larvæ and pupæ were found in others. In each instance these were located in moist sandy soil, two to three inches below ground level, and usually on the undersides of the roots below each of which the ants had constructed an open gallery. Immediately on opening up the shelter, the larvæ rapidly moved further into the nest apparently to avoid the light.

Empty pupal cases were very rarely found, and it was subsequently discovered that very soon after the emergence of the butterfly, the empty shell was broken up by the ants. The absence of larval excreta in the nests also interested us, and later investigation showed that this is removed, and in some instances apparently eaten, by the ants.

Shrubs at the bases of which one would expect to find larvae or pupae were usually less than 18 in. high, devoid of seeds, and presented a "scorched" appearance. In the case of some small plants the whole thing seemed browned off and dying. This was found to be due to the feeding habits of the larvae which eat only the bark off the shoots and stems, so cutting off the sap supply and causing death by ringbarking.

Most of the ants' nests were small and confined to the root system of a single shrub, but in several instances in stony ground where the bushes were growing fairly close to one another, the ants' nests were very large and extended from one bush to another. Several of these were carefully examined, and larvae and pupae were located up to two feet away from any foodplant. Openings to the surface, however, occurred at intervals of several inches, so that any emerging butterflies would have ready access to the outside.

The butterflies appear to have a long seasonal appearance, occurring on the wing from late October until the end of March, and as late as April on the Mainland. (Angel.) Although we have not actual specimens captured during October, some of those taken in early November were much worn, indicating that they had been flying for some considerable time. Apparently the eggs deposited by the early females emerge and pass through all the life stages during the same summer. This was borne out by the fact that a few very small larvae were found on November 19. Two of these were taken for breeding experiments, and both were in the final instar by January 30. Provided that the ants are fed (candied honey was used) they will live for weeks, and at present most of the original ants taken during November are still alive and active. The ant has been identified as *Myrmophyma* (*Campanotus*) *farquii* Crawley.

Thanks to Mr. H. MacKenzie, of Kingscote, whose kindness made it possible for us to visit many distant parts of the island, fresh supplies of foodplant have been sent over by air.

Ogyris atones was first described by Felder in 1865. (*Reise Novara Lepidoptera* p. 217, pl. 28, figs. 1, 2, 3) and since that time comparatively few specimens have been added to collections. Up to 1914 Waterhouse and Dyell had examined only 11 males and 5 females.

Male, above:

BUTTERFLY

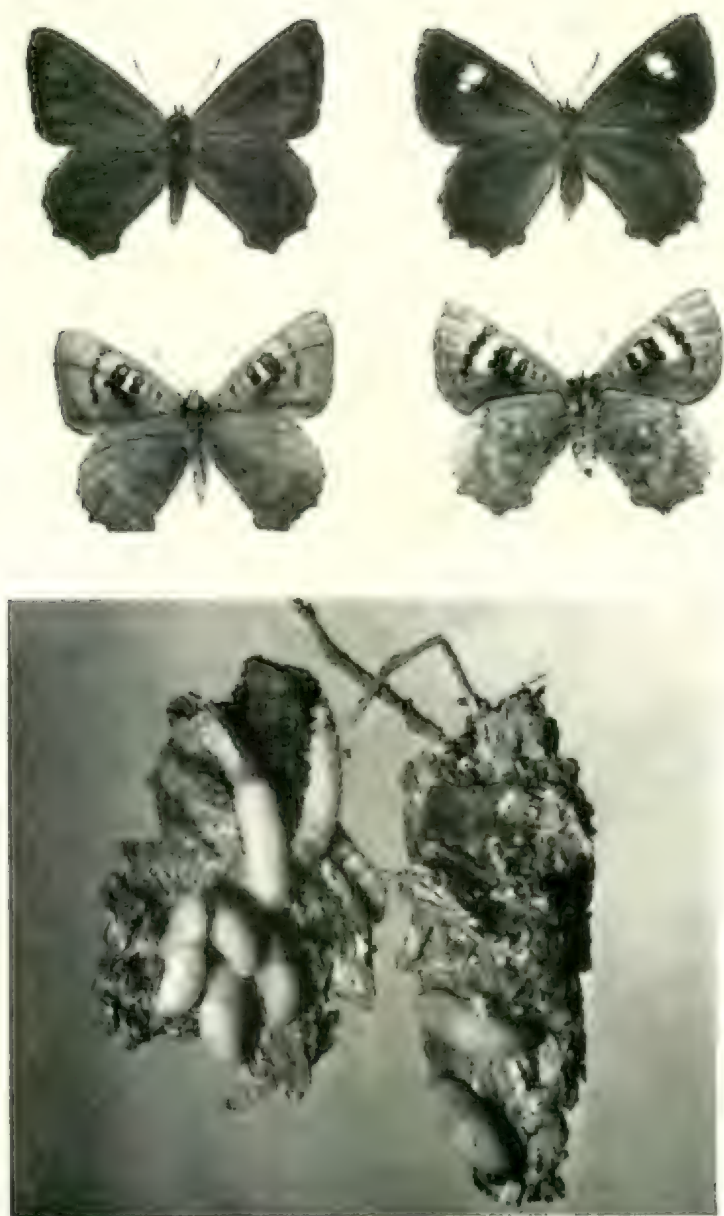
Forewing dull purple brown, apex and margins narrowly dark brown as far as dorsum. Cilia brown-black tipped white.

Hindwing dull purple brown, apex and margins dark brown. Cilia brown-black tipped white.

Beneath:

Forewing dull brown; a dark brown band beyond cell extending almost to dorsum, outer half of cell black divided with a bluish

PLATE VII



Upper: Imago, male and female
Lower: Larva and Pupa

white bar, inner half of cell with two narrow bluish white bars.

Hindwing dull brown with obscure slightly darker markings.

Female, above.

Forewing brown with a pale purple central area, a cream spot beyond cell, cilia brown-black tipped white.

Hindwing brown with a pale purple central area. Dorsum greyish brown becoming paler towards base, cilia brown-black tipped white.

Beneath:

Forewing similar to the male but inclined to be suffused greyish, post-cellular area to darker discal band, cream.

Hindwing brown slightly suffused greyish, with obscure darker markings which are very narrowly edged darker brown.

Sometimes freshly emerged females have a plum-coloured suffusion on the underside.

When resting on the ground or on dead sticks, the colour of the underside of the wings harmonises so perfectly with the surroundings that unless one sees the actual spot where the insect has settled it is almost impossible to locate unless it happens to move.

Habits: Does not fly on very dull or cold days, but will fly when disturbed if the weather is dull but warm. Appears on the wing from about 9.30 a.m. continuing until about 4 p.m. Flies about three feet from the ground, settles frequently, and is easily approached when settled. Does not appear to fly far from the breeding grounds, and is definitely local, not seeking foodplants away from the usual haunts.

LARVA

Length approx $\frac{7}{8}$ in. to 1 in. 25 mm.

Colour, creamy white, inclined to be semi-translucent towards the anterior end of the body; suffused pinkish brown or dull orange due to the colour of the underlying tissues showing through the skin which appears semi-transparent. Dorsal line ochreous, pulsating; most conspicuous in segments 5 to 9 inclusive. Segments 6, 7, 8 and sometimes 9 show a suffused yellowish marking dorso-laterally. The first segment has a shining brown depressed diamond shaped marking down the centre of which runs a very narrow whitish median line. This segment also bears a few pale brownish hairs. Anal segments depressed and carrying dorsally a pale brown irregular shaped marking, the colour of which is due to the presence of minute granulate spots. Several pale brown hairs occur along the edge of this segment, these are directed outwards. Pre-anal segment produced laterally into two turret shaped processes (similar to those occurring in the larva of *O. genavera*) which are pale brownish white at their apices

Spiracles black, conspicuous. Each segment carries one or two brownish hairs dorsally, there are usually two on Nos. 2 and 3 and 9 and 10, and generally one on each side of the others. Laterally each segment has one or two brownish white hairs, directed outwards. Head brownish white, retractile; mouth parts dark brown. Ventral surface of body creamy white, translucent, suffused pinkish brown in segments 2 to 5 due to internal colouration showing through the skin. Thoracic legs translucent brownish white, darker and more opaque at the tips. Prolegs and anal claspers creamy white and bearing numerous short brownish hairs, hooks black.

Larvæ very active when disturbed, avoid light by crawling deeper into the recesses of the ants' nest. Ants are in constant attendance with the larvæ, the major forms of the workers seeming to be mostly in demand. Feeding is at night when the bark of the shoots and twigs is eaten.

PUPA

Length $\frac{1}{2}$ in. to $\frac{3}{4}$ in., 12-14 mm. Attached by the tail and a central silken girdle.

Colour, pale yellowish brown with a faint whitish 'bloom'. Abdominal segments dorsally with a median darker brown longitudinal dorsal line. Abdomen strongly curved forwards thus constricting the segments ventrally; apex of anal segment truncate, slightly darker in colour and carrying a few brown hook-like setæ. When newly formed, pupæ are translucent and creamy yellow in colour, gradually darkening to pale yellowish brown within a day or two. As development proceeds, the eyes assume a slaty brown colour, this gradually extends to the region of the legs and antennæ. A couple of days before emergence the whole pupa becomes slaty black, and just prior to emergence assumes a pale slaty grey tinge due to the enclosed insect losing contact with the walls of the pupal shell.

The butterflies almost invariably emerge between the hours of 10 a.m. and noon, and do not suspend themselves for wing development until after they have crawled some considerable distance into a foodplant or similar situation. It seems necessary for them to crawl some distance if they are to develop the wings satisfactorily. This has since been demonstrated from breeding experiments: where specimens have emerged without being able to crawl at least two feet after leaving the pupa, the wings have failed to expand.

FOODPLANT: *Chorostemum glomeratum* (Santalaceæ) Common Sour Bush.

LOCALITIES: Kangaroo Island: Kingscote, Cygnet River, Emu Ridge, and Rocky River. Mainland: Moonta and Goolwa, South Australia, also Stirling Ranges, Western Australia.

JOHN MCCONNELL BLACK

1855 - 1951

(AN OBITUARY, by T. R. N. LOHMAN, Adelaide)

It is rare indeed that anyone has the opportunity of reaching the highest position possible in one's selected vocation, therefore how extraordinarily rare is it for a man to achieve this distinction twice in a lifetime. Such a man was John McConnell Black who died in his 97th year, working right up to the last, on December 2, 1951.

Mr. Black was born in Wigtown, Scotland, and received his education firstly at the Wigtown Grammar School and later at the Edinburgh Academy, at Taunton College School and finally in Dresden, Germany. He migrated to South Australia in 1877 and for five years was farming at Baroota in the lower north.

Relinquishing the farm, he held, between the years of 1883 to 1902, various important positions on the staff of *Hansard*, *The Register* and *The Advertiser*, and even today some of Black's editorials, written many years ago, are quoted. When the South Australian Parliament met for the first time in the present Assembly Building in 1889 Black was present as a *Hansard* reporter.

Almost 50 years ago, having reached the peak of his profession in the newspaper and editorial world he retired to devote his full time to the study of South Australian native and naturalized plants. He published *The Naturalized Flora of South Australia* in 1909. In the same year his first paper appeared in *Transactions of the Royal Society of South Australia*, and 44 were to follow. In 1922, the consummation of his researches was realized as part one of the *Flora of South Australia* which was completed in four parts by June, 1929. This immediately brought Black to the fore of systematic botanists within the Commonwealth, and his work was acclaimed not only locally but overseas as well—he became the doyen of Australian botanists.

In 1927 he was appointed honorary lecturer in systematic botany at the University of Adelaide. Representing the Adelaide University, The Royal Society of South Australia and the Melbourne Botanic Gardens at the International Botanical Congress in 1930, he had a further opportunity of discussing many critical specimens with foremost systematists in England and on the Continent. The Linnean Society, during this visit, accorded him an honour and made him an Associate.

His work brought him further distinctions and these included the Sir Joseph Verco Medal, the Australian Natural History Medallion, the Mueller Medal and the Clarke Memorial Medal. He was made a member of the Most Excellent Order of the British Empire by H.M. the King in 1942 in recognition of his outstanding work. Until advancing years made it imperative for him to conserve his strength he took an active part in the affairs of the Royal Society and its Field Naturalists' Section, of which he was a chairman.

At the age of 89, when most would have considered that they had more than amply justified their existence, Black brought out the first part of the second edition of his *Flora* (1944), the second part was issued in 1948. The whole of the first edition had been re-written and enhanced with many extra illustrations; numerous new records for the State were added (as well as extended local distributions) and several new species described. One must record, too, the debt of gratitude all owe to Miss M. Rayment who was Mr Black's constant companion for a great number of years and who nobly assisted him in proof reading and illustrating his work.

On several occasions when the writer visited Mr. Black he was always charmed by the courteous, unassuming manner, the deep interest he took in all aspects of scientific work, especially the re-establishment of the State

herbarium at the Botanic Garden Adelaide which he was hoping to see, and the forthright disposition with regard to his own work, all decisions being clear-cut and easily defined. He was an accomplished linguist and knew Latin, French, German, Italian, Spanish and Arabic, and the knowledge of these helped him considerably in his work. At all times he enjoyed meeting people, provided they also were interested in botany and plants.

He worked to the end and had just completed *Phindaginaceæ*, with a lengthy discussion concerning the merits of such names as *Statice* and *Limonium*, when he suddenly collapsed. Part three will be published as from *Meliocææ* to *Phindaginaceæ*.

It is to be regretted (and it is we who are the losers) that he did not manage to complete the full four parts of the second edition of his work. He has left copious notes and everyone will be delighted to know that Professor J. B. Cleland and Miss C. M. Hardley of Adelaide University have commenced immediately to edit these and complete the necessary work for part four.

PROTECTED WILDFLOWERS

A heavy fine recently imposed at Stawell for removing thryptomene from a forest reserve in the Grampians raises the question of whether a law should be passed in Victoria to prevent the sale of native flowers.

In the case mentioned, a semi-trailer truck was used and in procuring 'cut' flowers many plants had been pulled out by the roots. When apprehended, the driver claimed to have obtained the thryptomene from private property, but he was later intercepted by forestry officers while removing it from a forest reserve.

If the sale of wildflowers were prohibited it would be easier to prevent such cases, and would be a further step in the preservation of our rapidly vanishing native flora.

—A.E.B.

Note from J. Ros Garnet (Secretary, National Monuments and Parks Committee)

The inadequacies of the Victorian Wild Flower and Native Plants Protection Act have been the subject of frequent discussion among nature-lovers, and the Council of the F.N.L.V. has, on more than one occasion in recent years, considered proposals for making the provisions of the Act more effective than they are now.

Some time ago a number of these proposals was placed before the Minister of Forests who, through the Forests Commission, administers the Act. The proposals did NOT include a recommendation to prohibit the sale of wildflowers but, rather, to license it. The licensing system has been found to be effective in New South Wales where some of that State's spectacular wildflowers, in danger of extinction prior to the introduction of the system, are now noticeably re-asserting themselves.

A tag showing the license number should be attached to or accompany each lot disposed of to the retailer. It should be incumbent on the gatherer to produce his license on demand and for the seller to reveal the license number relating to the wildflowers on sale.

The Act should, furthermore, provide for a penalty of withdrawal or suspension of such licence when it can be shown that the licensee has gathered any wildflowers having the whole or part of the root system attached. This provision would tend to reduce careless picking.

A number of our wildflowers is now cultivated on a commercial basis and to such cultivators these additional provisions would clearly impose no hardship. Obviously a property owner, intending to clear his land on which protected wildflowers happened to occur, would not be liable for any penalty under the second provision unless, after rooting out the plants, he should elect to sell them as cut flowers for decorative purposes.

It is felt that any difficulty that might arise following infringements by employees of the licensee could be overcome by providing that such employees carry a written authority from the licensee on which should be endorsed the date and the name, address and licence number of the licensee employing him.

The Act should continue to permit the propagation for horticultural and/or commercial purposes of protected wildflowers. The requirement of a permit for private individuals to collect from Crown Lands and a licence for dealers, irrespective of the source of their material, would tend to restrain the irresponsible and encourage the responsible folk.

The imposition of heavy fines is claimed to be an ineffective deterrent to those who flout the Act. The prospect of cancellation of a licence and the consequent temporary or permanent prohibition from engaging in that form of business is likely to be a far more effective deterrent than a fine because its implications, while not so obvious, could be far more severe.

Thymomene is not a vanishing species because public demand for it has encouraged its horticultural propagation. What must be watched is the vandal and irresponsible trafficker who, unless constrained by law and public opinion, will despoil our loveliest fern gullies and the best of our floral bushlands.

MORE ABOUT SANDALWOOD

Dr. Margaret Chittaway's interesting notes, "With a cargo of ivory—sandalwood—and sweet white wine" [*Viet. Nat.* 68: 173 (Feb. 1952)], told something of the romance behind man's utilization of scented sandalwood timbers through the ages. The subject has long intrigued me, so perhaps a few additional scraps of information may not be out of place here.

Any of the 24 known species of *Santalum* (which now includes the quandongs, formerly classed as a distinct genus *Piscanum*) has a pale, more or less fragrant wood. There are seven endemic Australian species, seven more endemic in the Hawaiian islands, and the remaining ten are scattered on islands from Java to Juan Fernandez (*S. fernandezianum* is now presumed extinct). The first one to be commercialized was white sandalwood (*S. album*) of limited natural distribution between Timor and eastern Java; but in 1790 began the exploitation of 'ilahi' (*S. freycinetianum*), endemic on Oahu Island, Hawaii. This trade reached its peak in the 1820's when as much as 400,000 dollars' worth per annum was being shipped to China.

Sandalwood became the chief article of commerce in Hawaii, where the native kings made it a royal monopoly and levied taxes on their people in terms of sandalwood; even ships were purchased from abroad for an equal or a double tonnage of the fragrant wood. Trees were destroyed so recklessly that the species seemed doomed to extinction; but fortunately today *S. freycinetianum* has recovered so far as to be abundant in many parts of Oahu, forming the lower forest at about 1000 feet altitude, and it enjoys protection throughout the Territorial Forest Reserves. (See *Pacific Science* 1: 5-20, Jan. 1947).

Both *S. spicatum* (Swan River sandalwood) and *S. lanceolatum* (northern sandalwood) have been exploited in Australia, chiefly in the Western State where four tons were sent abroad as early as 1846. Up to 1930, £4,753,175 worth of the wood had been exported from the Commonwealth (mainly to China), the average annual output for the years 1919-1924 being 10,542 tons, then valued at £201,148; 100,000 lb. of sandalwood oil was distilled here in 1930. Most supplies within 300 miles of Perth have now become exhausted but the Western Australian Forests Department has taken steps to re-establish *Santalum spicatum* in parts of its old habitat. *S. obtusifolium*, ranging from far Eastern Victoria to tropical Queensland, yields an inferior timber. (See *Kew Bulletin* 1935, pp. 165-195—"The Structure of Some Sandalwoods".)

—J. N. W.

WHAT, WHERE AND WHEN

General Excursions:

Saturday, March 22—Motor Coach Excursion to Mount William and Mollison's Creek. Subjects: Aboriginal artefacts, Geology and Botany. Leader: Mr. Burston. Coach leaves Batman Avenue 8 a.m. Bring two meals. Reserved seat bookings, 18/-, with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1.

Preliminary Excursions:

Friday, April 25, to Sunday, April 27. Britannia Creek three-day excursion. Subjects: Birds and Botany. Leader: Miss M. Elder. Friday: 8.25 a.m. Warburton train from east end, No. 1 platform, Flinders Street. Book second single to Westburn. Car meeting train to carry packs. Walk of 6 miles to M.W.W.C. Hut, accommodates six people; good camping sites near and cars can go to hut except in wet weather. Bring all necessary food. Sunday: Return by 7 p.m. bus from Theks Corner which is 4 miles from hut. Names to Miss M. Elder, 17 Adelaide Street, Malvern, S.E.3, U7297.

Group Fixtures:

Sunday, March 16—Botany Discussion Group Excursion to North Williamstown. Subject: Mangroves. Leader: Mrs. M. Pinches. 1.10 p.m. train from Flinders Street, alight North Williamstown. Bring afternoon tea.

Monday, March 31—Botany Discussion Group, Royal Society's Hall, 8 p.m.

Tuesday, April 1—Geology Discussion Group, Royal Society's Hall, 8 p.m.

Thursday, May 1—Wildflower Garden Group, Royal Society's Hall, 8 p.m.

NATIVE PLANTS PRESERVATION GROUP

In consequence of growing interest in preservation and the extent of the active support which comes from Associates, the Group has dissolved, to form a Society which may include as members any supporters of preservation.

The Native Plants Preservation Society of Victoria has assumed the obligations of the Group and will carry on the work.

The Society meets on the third Tuesday in the month at 8 p.m. at 3 Denham Place, Thorak.

RESEARCH ON THE FUNGUS 'BLACKFELLOW'S BREAD'.

Important research has been undertaken by the C.S.I.R.O., Plant and Soils Laboratory, Brisbane, on the underground fungus *Polyporus mylittae*, or "Blackfellow's Bread". Samples of the fresh sclerotia, also fruiting bodies of the species, are urgently required. Field naturalists, particularly those living in the country where the fungus is known to occur, would perform a service if they collected specimens to send to the Research Officer, Plant and Soils Laboratory, C.S.I.R.O., Brisbane. It is essential to obtain samples in a fresh condition, so they should be forwarded per air mail. Any out-of-pocket expenses in the collection and transmission of the fungus will be reimbursed to the sender. Further particulars are obtainable from Mr. H. Stewart (Tel. FU 1096).

The Victorian Naturalist

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No. 820

PROCEEDINGS

The monthly meeting of the Club was held at the National Herbarium on Tuesday, March 11, 1952. The President, Mr. E. E. Lord, was in the Chair, and about 170 members and friends attended.

The following were elected and welcomed to the Club as Ordinary Members: Messrs R. G. Hemmy and C. G. Gipps; as Joint Ordinary Members: Mr. and Mrs. Parkin; and as a Country Member: Mr. V. Jacobs.

The Secretary announced that the next General Meeting will be held on MONDAY, APRIL 7, 1952, the first Monday in the month, as the Ordinary Meeting night falls on Easter Monday.

The Secretary advised that, according to the Club's By-Laws and Regulations, members must give two months' notification of any business they wish discussed at the Annual General Meeting to be held in June. Nominations for Office Bearers must be handed in by Monday, April 7, 1952. Nominations for the 1952 Australian Natural History Medallion must also be handed in by that date.

The President announced that Mr. Tarlton Rayment had donated twelve copies of his book "Eagles and Earthlings" to the Club for sale at 5/- per copy, proceeds to go to Club funds.

The President advised that the C.S.I.R.O., Plant and Soils Laboratory, Brisbane, have undertaken research on the fungus "Blackfellow's Bread" (*Polyporus mylitus*) and are urgently in need of fresh specimens. Members desiring to assist are requested to forward specimens by air mail to Mr. Webb, Plant and Soils Laboratory, C.S.I.R.O., Brisbane. Any expenses incurred in obtaining and forwarding such specimens will be reimbursed.

The speaker for the evening was Mr. Edmund Gill, Paleontologist of the Melbourne Museum and a member of the Club. Mr. Gill, who chose as his subject "Geology and the Antiquity of the Aborigines", drew a graphic geological picture of early Melbourne and the Port Fairy/Warrnambool district and spoke of the fascinating research into the history of the Aborigine, who came to Australia via the Malayan Peninsula and New Guinea towards the end of the Pleistocene Age. Mr. Gill illustrated his talk with slides and several paintings of early Melbourne shown through the epidiascope, and two colour films—"The Story of Melbourne's Rivers" and "Warrnambool District".

Members' interest and appreciation were apparent by the hearty applause that followed the lecture.

The President thanked Mr. Gill for his very interesting lecture, and was supported by Mr. Baker.

The meeting concluded at 9.50 p.m.

EXHIBITS

FLOWERS—Pressed specimens of plants from Mount Buffalo (including *Festuca muelleri*, first record for locality), and from Mallacoota Inlet—Mr. H. Stewart. Alpine cushion plants from Great Lake, Tasmania—Mr. V. Miller. Flowers from Lake Mountain—Mr. H. Haase. Bushy Clubmoss (*Lycopodium densum*), South Gippsland—Miss M. Wigan. *Swainsona procumbens*—Mr. Jennison.

NEST—Deserted nest of Song-thrust found in Bottlebrush growing on the grave of Baron von Mueller, in St. Kilda Cemetery—Mr. H. Stewart.

MINERALS—Salt crystals from Altona—Mr. Hanks. Collection of specimens—Miss E. C. Carberry.

FOSSILS—Whalebone, sharks' teeth and fish remains from Beaumaris—Mr. R. Davidson. Similar material from Grangeburn, Hamilton—Mr. D. Jeffrey. Exhibit from National Museum of fossils from Keilor and Western District—Mr. E. Gill.

ARTEFACTS—Aboriginal artefacts from Mt. Buller—Mr. P. Fisch.

WHAT, WHERE AND WHEN

General Excursions:

Easter Monday, April 14—Hurst Bridge to Wattle Glen. 5 mile walk. Subject: General Natural History. Leader: Mr. K. Atkins. 10.15 a.m. Hurst Bridge train, Prince's Bridge. Book second return Hurst Bridge. Bring one meal and a snack.

Friday, April 25—Sunday, April 27—Britannia Creek, three-day excursion. Subjects: Birds and Botany. Leader: Miss M. Elder. Friday, 8.25 a.m. Warburton train from east end No. 1 Platform, Flinders Street. Book second single to Westburn. Car meeting train to carry packs. Walk of 6 miles to M.W.W.C. Hut, accommodates 6 people; good camping sites near, and cars can go to hut except in wet weather. Bring all necessary food. Sunday, return by 7 p.m. bus from TE Corner, 4 miles from Hut. Names to Miss M. Elder, 17 Adelaide Street, Malvern, S.E.3, U7297.

Preliminary Notice: Saturday, May 24. You Yangs. Bus Excursion. Subjects: Birds and Eucalypts. Leader: Mr. E. Hanks. Bus leaves Batman Avenue. 8.30 a.m. Bookings, 8/-, with Mr. K. Atkins, Botanic Gardens, South Yarra, S.E.1.

Group Fixtures:

Monday, April 28—Botany Discussion Group, Royal Society's Hall, 8 p.m.

Thursday, May 1—Wild Flower Garden Group, Royal Society's Hall, 8 p.m.

Tuesday, May 6—Geology Discussion Group, Royal Society's Hall, 8 p.m.

THE FIELD NATURALISTS CLUB OF VICTORIA.

BY-LAWS.

1. These By-laws shall be read and construed in conjunction with and supplementary to the Articles of Association of the Club in accordance with Article 76.

2. Any amendment, addition or rescission of any of these By-laws shall be published in the *Victorian Naturalist* within two (2) months of the change being effected. Such publication shall be additional to the requirement of Art. 76 that such notices be posted at the Registered Office.

Amendment
or
Rescission.

3. Any person having an interest in the study of natural history and who is prepared to further the objects of the Club shall be eligible for nomination as a member.

Eligibility
for
Membership.

4 (i). Nomination for membership shall be submitted on the Club's "Application for Membership" form on which shall appear a summary of its objects and on which shall be entered the name and address of the nominee, the category of membership to which the application refers, reference to the particular branch (if any) of natural history in which the nominee is interested, and the signatures of the nominee, his proposer and his seconder, and,

Nomination
for
Membership.

4 (ii). in the case of a nomination as a Junior Member, in addition the nominee's age next birthday shall be stated.

Junior
Members.

5. Both the proposer and seconder of a nomination for membership shall be financial members of at least two (2) years standing.

Proposer
and
Secunder.

6. The Annual Subscription of a member shall be due and payable (a) immediately on election or (b) on the first day in May in each year as the case may be. The rates which shall be published each year in the *Victorian Naturalist* for the month of June are as follows—

Subscriptions
(Arts 11, 12,
13).

i. Ordinary Members	£1 10 0
ii. Joint Ordinary Members	2 0 0
iii. Country Members	1 0 0
iv. Joint Country Members	1 7 6
v. Junior Member	5 0
vi. Junior Member, who elects to receive the <i>Victorian Naturalist</i>	15 0
vii. Life Member (with an adjustment as provided in Art. 6 [c])	30 0 0

7 (i). Each Life Member, Ordinary Member, Country Member and Honorary Member of the Club shall be entitled to receive without extra charge one copy of each *Victorian Naturalist* published during the currency of his subscription (Art. 11).

Receipt of
*Victorian
Naturalist*

7 (ii). A Junior member who elects to do so shall on payment of the additional sum of 10/- be entitled to receive one copy of each *Victorian Naturalist* published during the currency of his subscription.

- Subscriptions to Journal.** 7 (iii). A non-member of the Club on payment in advance of the sum of 28/- shall be forwarded, post free, one copy of each *Victorian Naturalist* published during the currency of his subscription. Posting shall be discontinued at the end of this term and not resumed until the subscription has been renewed.
- Exchange and Free List.** 7. (iv). At the direction of the Council the *Victorian Naturalist* shall be made available without charge to approved Institutions, Organizations and individuals if possible on an exchange basis.
- Record of Exchange and Free List.** 7 (v). A record of the Exchange List and Free List shall be kept by the Librarian. Such lists shall be reviewed at least triennially by the Council or by a Committee appointed by the Council. Recommendations arising out of such review shall be considered at the April Meeting of the Council.
- Removal from Mailing List.** 8 (i). A member who fails to pay or renew his Annual Subscription within 3 months of the due date may have his name removed from the *Victorian Naturalist* Mailing List, and the Treasurer shall report to the next Council meeting the names of all members so removed.
- Unfinancial Members.** 8 (ii) A member whose Annual Subscription is in arrear for more than twelve months shall be regarded as unfinancial and liable to have his name removed from the Register of Members and from the Mailing List. The Treasurer shall table a list of unfinancial members at the Council Meeting in August of each year.
- Reminder to Members in Arrears.** 8 (iii). The Council may delegate to the Treasurer the task of issuing to members a formal reminder regarding overdue subscriptions. Failure to issue such reminder shall not be a valid reason for non-payment by a member who is in arrear.
- Changes in Time and Place of Meetings.** 9. Changes in time and places of any General Meeting shall be announced either at a General Meeting or by publication in the Club's Journal.
- Use of Club Premises and Property.** 10 (i). The premises for the time being occupied by the Club and the property of the Club housed therein including the library shall be available for the use of members only at such times as such premises or property are available for an authorized meeting of the Club or of one of its Branches, Groups or Sections or when one or more officers of the Council are in attendance or at such other times as may be authorized by the Council.
- Authority for Removal of Property.** 10 (ii). No property of the Club including library books and publications shall be removed from the Club's premises without the knowledge and approval of the Librarian or other authorized person.
- Loan of Library Books.** 10 (iii). The maximum period of retention of library books by borrowers without renewal shall be 2 months after which a fine of 2/- per month shall be payable to the Librarian. The maximum period of any loan shall be six months.
- Expenditure by Librarian.** 10 (iv). The Librarian, without reference to the Council, shall be entitled to spend up to five pounds (£5) in any one financial year on the purchase of books for the library providing that the expenditure on any one item shall not without the sanction of the Council exceed two guineas (£2/2/-).

11. The contributor of a paper to the *Victorian Naturalist* shall be entitled to a maximum of three (3) free copies of the Journal which contains his contribution. Application for such copies shall be made to the Librarian. Contributions to *Victorian Naturalist*.

12. Unless specifically authorized by the Council, the Club shall not be responsible for the payment for reprints of any papers or articles contributed to the *Pictorial Naturalist*. Reprints.

13 (i). The loan of any block used for the reproduction of illustrations in the *Victorian Naturalist* shall be on such conditions and at such fee as shall be fixed from time to time by the Council. No block shall be loaned for publication without the approval of the owner of the copyright. Illustration Blocks.

13 (ii). A record of the receipt, despatch, use and disposal or loan of such blocks shall be kept by the Librarian. Record of Blocks.

14 (i). A member causing wilful damage to any property belonging to the Club or for which the Club is responsible shall incur such penalty as may be decided upon by the Council. The Council may require such damage to be made good in default of which recourse may be had to the processes of Law and the offender may be suspended or expelled. Damage to Club Property (Arts. 9, 69 and 7A (d)).

14 (ii). The responsibilities and penalties referred to in clause 14 (i) shall extend to public property, especially property of natural history interest, Crown Lands, National Parks, National Monuments, Native Reserves, Wild Life Sanctuaries and the like and shall include responsibility for wildflower protection during field excursions. Nature Protection by Members.

15 (i). Any person, whether a member or not, participating in an official field excursion shall not gather wildflowers or other natural history specimens except on the authority of the leader or his deputy (if any). Restraint on Excursions.

15 (ii). An Excursion Leader shall be recognized for the time being as representing the Club. Excursion Leader.

16. Authority to make public statements, either orally or in writing, on behalf of the Club shall be restricted to the President, Vice-Presidents and Secretary of the Club and such other member or members as the Council from time to time may authorize. Public Statements on behalf of Club.

17. The appointment of a proxy for a General Meeting of the Club (Arts. 27 and 28) shall be limited to a period not exceeding twelve months. The appointment shall take the form of a notice in writing signed by the principal and addressed to the Secretary of the Club. Such notice shall indicate the name and address of the proxy and the period and purpose for which he is to act as proxy. Proxy at General Meeting.

18. The appointment of a proxy to act for any one member at meetings of the Council (Art. 39) shall be limited to two (2) successive meetings and such appointment shall be notified to the Secretary of the Club in the manner above prescribed. Proxy Councilors.

19. For the purposes of the Income Tax Act and any other legal requirements the Secretary of the Club shall be the Public Officer. Public Officer.

- Inspection of Books and Accounts (Art. 60).** 20. The books and accounts of the Club's transactions shall be available on demand for inspection by a financial member of the Club only at a General Meeting. The demand for inspection shall be signed by the member making a demand and countersigned by two other financial members. Such demand shall be delivered to the Secretary of the Club at least fourteen (14) days prior to the date of such meeting.
- Formation of Group or Section.** 21 (i). On the joint representation of not less than six financial members of the Club the Council may authorize the formation of a Group or Section within the Club for the purpose of its members meeting periodically to pursue the study of a particular branch of natural history or to further any one of the objects for which the Club is established. The members of a Group or Section shall be governed by the Articles of Association and these by-laws insofar as they may apply.
- Minutes of Group or Section Meetings.** 21 (ii). Minutes of any meeting of a Group or Section shall be kept by a Secretary appointed for the purpose and such minutes shall be made available to the Council on demand.
- Annual Report of Group or Section.** 21 (iii). The Secretary of the Group or Section shall submit an annual report to the Council not later than the date of the General Meeting of the Club immediately preceding the Annual General Meeting.
- Finance of Group or Section.** 21 (iv). All financial transactions of a Group or Section shall be subject to the approval of Council.
- Officers of Group or Section.** 21 (v). The Council shall be informed of the names of the officers of a Group or Section immediately following upon their election or appointment.
- Dissolution of Group or Section.** 21 (vi). A Group or Section may disband at any time and SHALL do so if and when the attendance at six successive meetings of such Group or Section falls below six. The Council shall be notified immediately such action is either decided upon or becomes necessary.
- Meeting Place for Group or Section.** 21 (vii). The Council may make available a meeting place for the members of a Group or Section upon such conditions as it may think fit.
- Group Members.** 22. A Group shall consist of members of the Club only.
- Formation of a Branch (Art. 41)** 23 (i). A Branch of the Club may with the consent of the Council be established in any place outside the corporate limits of the City of Melbourne. Such Branch shall be governed by its own members but its aims and objects shall not be inconsistent with those of the Club. The Club shall not be responsible in any way for the liabilities of a Branch.
- 23 (ii). On payment to the Club of such sum as shall be fixed by the Council a member of a Branch shall be entitled to receive one copy of each *Pictorial Naturalist*, published during the currency of such Subscription.
- Use of Club Badge by Branch.** 23 (iii). The members of a Branch shall be entitled to the use of the Club badge provided the design shall not be altered and that the inscription shall be varied by the addition of a word or letters identifying the Branch.

- 23 (iv). The use of the Club Library by a member of a Branch shall be subject to the conditions applying to members of the Club. Use of Club Library by Branch
- 23 (v). Subject to the usual discretion of the Editor a Branch shall be entitled to publish its transactions and its members to submit papers and reports for publication in the *Victorian Naturalist*. Use of Naturalist by Branch
- 24 (i). A Club or Society organized for the study and/or advancement of natural history and having its headquarters anywhere beyond a radius of twenty miles of the City of Melbourne shall be eligible for affiliation with the Club in accordance with Art. 44. Affiliation of Country Clubs
- 24 (ii). A Club or Society organized for the study or advancement of a special and/or particular branch of natural history and having its headquarters within a radius of twenty miles of Melbourne shall be eligible for affiliation with the Club in accordance with Art. 44. Affiliation of Metropolitan Clubs
- 24 (iii). Application for affiliation by an eligible organization shall be in writing and shall be subject to endorsement by a majority vote at an Extraordinary Meeting of the Club. Application for Affiliation
- 24 (iv). The Club may cancel the affiliation of any organization by a resolution passed by a two-thirds majority of members voting at an Extraordinary Meeting called for the purpose. Such cancellation shall be notified in writing, within fourteen days of the decision being made, to the Secretary of the organization concerned. Cancellation of Affiliation
- 24 (v). An organization granted affiliation shall pay in advance to the Club an Annual Contribution equal to the Annual Subscription of an Ordinary Member of the Club, provided that the amount may be varied or waived at the discretion of the Council. Affiliation Fee
- 24 (vi). So long as it remains affiliated the organization shall furnish to the Council of the Club an Annual Return showing its total membership as at the end of its financial year, a list of its current office-bearers, and its most recent Annual Report and Balance Sheet. The first such Return shall be furnished at the time of application for affiliation. Annual Return of Affiliated Body
- 24 (vii). Failure to furnish such Return within three months of the close of the financial year of the affiliated organization may, at the discretion of the Council, terminate the affiliation. Automatic Termination of Affiliation
- 24 (viii). An affiliated organization may nominate in writing one of its officers as its delegate. In this capacity he shall have the same rights and privileges as a financial member of the Club except that he shall have no vote at an Extraordinary Meeting of the Club nor shall he be eligible for nomination as an officer of the Club. Delegate
- 24 (ix). An affiliated organization or, should the organization so elect, its delegate shall have the right to receive one copy of each issue of the *Victorian Naturalist* published during the term of its affiliation. Its members shall have the right to borrow books from the Club's Library and to attend all General Meetings and Excursions held by the Club but not to the exclusion of financial members of the Club. At such times and on such occasions members of an affiliated organization shall be bound by the Club's Articles of Association and by-laws insofar as they may apply and (excepting the delegate) shall not be eligible to vote. Rights and Privileges of Delegate and Members of an Affiliated Body

Consent to
pursue joint
action.

24 (x). Any action or project proposed to be undertaken jointly by the Club and an affiliated organization shall be commenced only with the consent of both the Council of the Club and the delegate of the affiliated body.

Sharing of
Costs and
Profits, etc.

24 (xi). Any expenditure or financial loss or gain incurred in furthering any action or project undertaken jointly by the Club and one or more of its affiliated organizations shall be shared in proportion to the revenues from the current membership subscriptions of the Club and the affiliated bodies.

Delegate's
Voting
Rights.

24 (xii). The delegate from an affiliated organization shall have the right, notwithstanding anything to the contrary in any other by-law, to vote on any Resolution and to attend at any Council meeting at which joint action is to be discussed or decided.

Australian
Natural
History
Medallion.

25 (i). The Club having been appointed to manage the affairs of the Award of the Australian Natural History Medallion the Secretary of the Australian Natural History Medallion General Committee shall, during the month of March in each year, prepare and issue to all known organizations having natural history interests a circular inviting nomination for the Award of the Australian Natural History Medallion and the appointment of a delegate to the Medallion General Committee.

25 (ii). Nominations for the Award shall be invited from Members of the Club at the General Meeting in April and the nominee shall be selected and endorsed by the Council at its next succeeding meeting at which time (if necessary) the Council also shall appoint the Club's delegate to the Medallion General Committee.

25 (iii). Unless otherwise decided by (or in the absence of direction from) the Medallion General Committee the Council of the Club shall appoint a member of the Club to be Secretary to such Committee. Such Secretary shall keep the minutes of proceedings and take such other action as is required of him by both the Medallion General Committee and, consistent with the Rules thereof, the Club.

HIDDEN TREASURE

There is nothing which intrigues me more than a sketch plan with details showing how to find an outstanding wildflower area. Such a sketch plan always reminds me of buried pirate treasure—the landmarks are there, the plan is real enough, the instructions would often fit readily into an adventure story—only the pirates are missing. But the chance of finding the hidden treasure is infinitely greater than in the case of a pirate cache.

It was such a plan that took a small party of us to a glorious patch of many hundreds of Purple *Diuris* orchids (*Diuris punctata*) at Beaconsfield. Certainly, in trying to follow the plan we were at first sadly astray, but just when the search seemed hopeless, a lucky chance took us to a sight which would delight the eyes of any flower lover.

And it was such a plan which led another party of naturalists to Ladd's Corner near North Beaconsfield where there is an attractive variety of wildflowers and where it is hoped to reserve an area as a wildflower sanctuary.

I hope to see many more sketch plans with their air of intriguing mystery and just that element of doubt to add interest to the search for "hidden treasure".

ADMIRALTY BAY, NEW ZEALAND

By A. A. BRUNTON, Carlton, Vic.

Fifty years ago I was engaged in the fishing industry in Admiralty Bay, New Zealand. Tasman anchored in this bay in 1642 on the day following the killing of some of his men by the Maoris of Tasman Bay. Cook gave the bay its name and, later, D'Urville anchored in it after making the first passage through the French Pass.

Near the mouth of the bay are the Trios islands, and these, and the larger Stephens Island further out in Cook Strait, were the last homes of the tuatara lizard, *Sphenodon punctatus*, of the order *Rhynchocephalia*. It was really not a lizard, but very like one, and is famous as having a rudimentary third eye on the top of its skull. They were about two to three feet long and appeared to live quite amicably in the same burrows as the mutton birds. One reason for their survival from Mesozoic times till the present day is one which no scientist appears to have noticed, and that is the intense fear that the local Maoris had for the creature. They regarded him as our equivalent of the devil, and I remembered frightening two men nearly out of their wits by awakening them from sleep and dangling a tuatara above their heads by the tail.

Now the Maoris before the coming of the whites were a meat hungry race, with an appetite only satisfied after a successful battle. There was practically no animal food, and these bulky lizards would make good eating, but the natives' fear enabled them to survive the coming of man. It is not beyond the bounds of conjecture that the third eye was developed in a long struggle for survival against the attacks of the flying Pterodactyls for untold millions of years in Jurassic and Cretaceous times.

At the time of which I write, there was staying in Admiralty Bay an old German Professor who was collecting material for museums in his country. He hired a fisherman and boy to take him around, and though his English was very limited he got along with the aid of a phrase book. The phrase most in use was "I cannot express myself." One day the Professor and the boy, Jerry, landed on one of the Trios to study the tuataras. Jerry pulled one out of a burrow by the tail and handed it to the Professor who immediately sat down and began to take notes of the living fossil. Suddenly it grabbed his hand and would not let go. Taking out his watch he noted the time and gave Jerry to understand that he wanted to observe the lizard's reactions and ordered the boy to take his butterfly net and capture any butterflies or moths on the island.

At the end of an hour Jerry returned and found the Professor reading a book and the lizard still hanging on. Noting the time, he ordered the boy to open its jaws and release his hand, and went on examining more specimens!

It was from the larger, 1000-foot-high Stephens Island that later on Professor Dendy, of London, received six live specimens for study in 1907, and in his paper before the Royal Society, full details are given of the wonderful pineal eye. This island is very inaccessible and in this case it aided the survival of the tuatara, but the Trios are more sheltered and a landing is not difficult.

At this time Admiralty Bay was the home of the celebrated "Pelorus Jack" which was popularly supposed to pilot steamers through the bay. An old settler informed me that the fish had been in the bay for 45 years, and he finally vanished about 1910. At first for some years he had a mate. Technically he was known as Risso's dolphin or grampus. If so he was bigger than usual for we estimated him to be 18 feet long and 4 feet in diameter. He had a rounded nose like the end of a soda-water bottle, was bluey-grey on the back and a dirty white below. It has been frequently stated that he lived in the Pelorus Sound, but he was never once seen in

the Sound. His regular habitat was in Admiralty Bay between the French Pass and Clay Point, a ten mile stretch. Only once in 45 years had he ever been seen south of the Pass. He would meet the steamer soon after coming through the Pass, and, facing the same way as the boat, would leap out of the water and hurl himself sideways against the starboard bow, then dive under the ship and repeat the leaps on the port side. If another steamer was following he would leave the first after a little while and go leaping over the water to meet the second. It was a great and thrilling sight to see him so filled with the joy and verve of life. The passengers, always waiting for him with cameras, could feel the thuds on the ship's plates. Along his hide were long scratches made by the rivets. Like the Scots who bless the Duke of Argyll for installing telephone posts in Scotland, so Pelorous Jack blessed the ship for helping to rid himself of the barnacles with which he was infested. Piloting the ship was a belief carefully fostered by a tourist-conscious government.

The grampus lives on octopus. These swarm around those coasts and one day I was badly bitten by one in the left hand, the parrot-like bill cutting in to the bone. Within 20 minutes my hand was swollen like a boxing glove, and the swelling extended along my arm and down my side. Being 45 miles by sea from a doctor and a gale blowing, all we could do was to poultice the wound with camp oven bread, and in three days the effects wore off. Stripped of the slimy exterior the round, white, rubber-like arms cut into sections make ideal fishing bait.

In a gully on the eastern mainland shore of the bay I discovered a stone age site where man had been fashioning stone implements for a very long time, and on the western side on D'Urville Island, in a cleft in the cliffs, I crawled through a narrow tunnel into a large secret Maori burial cave and spent an interesting time with the relics. In the tunnel heaps of red ochre had been placed to betray intruders.

OCCURRENCE OF AUSTRAL LADY'S TRESSES

Early this year (1952), Austral Lady's Tresses (*Spiranthes australis*) have appeared in numbers along the swampy ground on "Brandie Braes", Lardner. When the swamp was uncleared (1909), cattle opened up the undergrowth and scrub, and we gathered dozens of Sun-orchids (*Thelymitras*) of various shades of blue (except *T. grandiflora*). Some years later (1930), after the land had been ploughed, we found Leek-orchids (*Prasophyllum*) very numerous.

This season there has been scarcely any *thelymitras*, one *prasophyllum*, several *microtis* and numerous *spiranthes*. We have had this land continually under observation for a long lifetime and only in the last few years have we found the dainty pink and white Austral Lady's Tresses.

—C. C. CURRIE.

EXHIBITION OF WILDFLOWER PHOTOGRAPHS

The Directors of Kodak invite members of the F.N.C.V. to be present at the official opening by Mr. P. Crosbie Morrison of a display of photographs of Australian Wildflowers by Mr. H. T. Reeves, in the Kodak Gallery, Collins Street, at 3 p.m. on Monday, April 21

WHAT WOOD IS THIS?

Part 4

By M. M. CHATTAWAY

(Reprinted from C.S.I.R.O. *News Letter*, August-October, 1951)

HOW TO MAKE A KEY FOR IDENTIFYING TIMBER:

The principles underlying all mechanical devices for identification, whether of plants or animals or timber, are fundamentally the same. The features to be used having been decided on, the specimens to be identified are examined for each feature in turn to find out whether it is present or not. At each examination separation into two groups occurs, the number of specimens in each getting fewer as more groups are formed. This subdivision is continued until only one specimen remains.

This type of key is relatively simple to prepare, and it is a common and useful exercise to give students a collection of timbers with which they will be working at some future date and to allow them to make their own keys. This type of key is usually referred to as a *dichotomous* key as it is based on the principle of two alternatives and sorts the woods into two groups at a time. Its great disadvantage is that the features are always considered in a definite order, so that a moment is liable to come when the less experienced user—and indeed sometimes the experienced one too—is faced with a decision he is unable to make: "Is such-and-such a feature present or not?"; "Do I call this size intermediate or small?" The user of the key must make a decision because the key demands it; he cannot do so because his lens isn't strong enough to allow him to see clearly, or because he hasn't enough knowledge or experience to make up his mind. The result is that he either gives up in disgust, or laboriously follows on through both groups in the hope of picking up some clue later on.

It was to resolve this quandary that the card-sorting system was first applied to the identification of wood. By using this system there is no arbitrary order in which the features must be taken, and obscure or doubtful features can be left till last, or even neglected altogether without prejudice to the final result. As with the dichotomous key, once the underlying principles are grasped it is quite easy to build up one's own key, and to add to it from time to time as sufficient details of new timbers come to hand. The cards can be kept in any order, so that the addition of new ones presents no problems of arrangement.

Multiple entry perforated cards are used for this key, each card representing one species, or a group of inseparable species. Each perforation on the card represents one anatomical feature that can be seen on the wood, or one other piece of information such as weight, hardness and so on, which help to identify the timber.

Although the card-sorting key may be quite an elaborate affair, with printed cards on which each hole is well labelled according to the feature it represents (see illus.), this is an elaboration that is not necessary for the amateur who is preparing his own key. Indeed, to learn the timbers and the values of the different features it is far better to prepare one's own key than to accept one ready made from someone else. Making your own cards may take time, but that time is well spent if it familiarizes the maker with the different wood features, and increases his powers of observation with a lens.

A plain punched card on which the holes are numbered is all that is needed, and a feature list to correspond, in which each number on the card is that of one of the features on the list. This may at first make the work slow when the key is in use, but familiarity with the list is soon acquired and the most used numbers readily memorized. The great advantage for a beginner is

that the features used are not so briefly listed as when they are printed on the card, and a short descriptive sentence may be added to the list.

The features enumerated in earlier parts of this article (see *News Letters* Nos. 182-3, 185), are the ones that have proved the most useful with both a *dichotomous* and a *card-sorting* key. When the list has been prepared and numbered and the cards with numbered holes are ready, the method of making a *card-sorting* key is as follows: Examine the specimens of a known timber and list all the features you can find, both those which you can see with the naked eye and those that can only be seen with the lens. Check this list if possible against several authentic specimens, as there is often a good deal of variation from sample to sample. When you are certain that you have checked every feature on the list, take a card and name it for the wood you are examining and notch out all the features you have found for it. If you are in doubt about a feature it is safer to notch the card, provided you indicate on the card that this is a doubtful feature, or difficult to observe, or that it occurs in some specimens and not in others. It is always better to end with too many cards than to eliminate one which may be the wood you want. Add to the back of the card any details about the wood that you may have found which are not among the listed features, and your card is then complete, ready to be used when a bit of wood with just those features comes to hand. Gradually your set of cards can be increased as more authentic samples of timber come your way, or it may be added to from descriptions and from data given by other wood anatomists.

When you come to use this key, the procedure is to check the features of the unknown timber against those on the list, noting their numbers, just as you did for the known timber when you were making the key. Then make sure that the cards are all facing the same way—i.e., that the cut-off corner is uppermost and to the right—and run a knitting needle or fine rod through the hole corresponding to one of the features. Experience will teach you which features prove most reliable and helpful, and these are the ones to take first. All the notched cards, representing woods in which this feature is present, will drop from the pack. Those without it remain on the needle and can be discarded. By repeating this process with other features fewer and fewer cards are retained, until only one or two remain. Sometimes only one card will drop on the final sorting, but even if two or three are left it is usually possible to distinguish the wood in question from details listed on the back of the card, or by a comparison of other notched features which have been neglected previously—those difficult or doubtful features that are so very troublesome in a *dichotomous* key, but which can by this system be left till last.

If photographic apparatus is available, small photos showing the wood at a low magnification can be affixed to the back of the card. These show the wood as it appears with a hand lens and are very useful for a final check against the actual timber specimen to confirm the identification. They can also be used for separating two woods which have dropped out together through having similar features notched, but which can be separated by subtle differences and tissue contrasts that are difficult to put into words, but which nevertheless show clearly in a photograph.

The *card-sorting* key gives a quick way of identifying far more timbers than can be carried in the memory, and though it will not give the answer in the case of a totally new or unknown wood for which there is no card, it can still help towards its identification. Timbers with similar structure often turn out to be related, belonging to the same family or genus. If a totally new timber is sorted on its most conspicuous features a nearly related timber may be among those which fall out, so that it may be possible to get an idea of its family, sometimes even of its genus. This can give the needed clue, and further reference to books may produce a description that will place its identity beyond doubt.



A POT OF GOLD

Pots of gold at the foot of the rainbow really belong to the world of make-believe, but here you see a very good substitute.

All you need to do is to open an account with the State Savings Bank of Victoria, and deposit something **every week**. That "every week" is important, it's the regularity that counts, and that rapidly builds the balance of your account with a speed that will surprise you.

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